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The Meaning of Internet Access in Myanmar

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Declaration

I, Karen H. Jørgensen, declare that this thesis is a result of my research investigations and findings. Sources of information other than my own have been acknowledged and a reference list has been appended. This work has not been previously submitted to any other university for award of any type of academic degree.

Signature……

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ABSTRACT

As the world has become dependent on digital solutions for development in social, economic and political contexts, countries are categorised regarding the level of digitalisation. In this regard, Internet is an essential element, where digital solutions are reliant on connecting citizens. In Myanmar the transition towards digitalisation has occurred only in recent years. The country has seen a huge change from being one of the least digitalised countries before 2010, to becoming one of the most digitalised developing countries today (Calderaro, 2016; Telenor, 2018). The digital development has contributed to many opportunities, but also several challenges and risks. Internet and social media can contribute to business opportunities, where especially women are becoming more social and economic empowered, but it has also resulted in the spreading of hate speech. In economic terms, Internet access has contributed to economic growth, increased trade and digital financial solutions, but the lack of cyber capabilities and regulations restrict the effectiveness of these improvements. Statistically, Internet access demonstrates a digital progress in Myanmar, with number of Internet users and mobile phone owners continuously rising. Nonetheless, digital divides provide a huge challenge in ensuring universal and affordable access to Internet, where gender, demography and skills are relevant elements.

This thesis will discuss how social, economic and political aspects are affected by increased access to Internet, and assess the current situation of Internet, both in relation to the sociotechnical transitions approach.

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ACRONYMS

A4AI	Alliance for Affordable Internet
ASEAN	Association of Southeast Asian Nations
BBC	British Broadcasting Corporation
BTI	Bertelsmann Stiftung's Transformation Index
CSO	Central Statistical Organisation
FDI	Foreign Direct Investment
GDP	Gross Domestic Product
GNI	Gross National Income
ICT	Information and Communications Technology
ITU	International Telecommunications Union
LDC	Least Developed Countries
MCRB	Myanmar Centre for Responsible Business
MDG	Millennial Development Goals
MIMU	Myanmar Information Management Unit
NGO	Non-Governmental Organisation
NLD	National League for Democracy
NMBU	Norges Miljø- og Biovitenskapelige Universitet
UN	United Nations
UNCTAD	United Nations Conference on Trade and Development
UNDP	United Nations Development Programme
PRIO	Peace and Research Institute Oslo
SDG	Sustainable Development Goals
TT	Technological Transitions

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1. INTRODUCTION

Digitalisation and access to Internet has revolutionised the world. Countries have become dependent on digital solutions on individual and governmental levels, as well as for economic growth and political stability. Digitalisation has become a tool in development policies, contributing to the differences between the levels of digitalisation in various countries. Between 2005 and 2015, the number of Internet users tripled on a global level, and as many as 3.2 billion people were online at the end of 2015 (World Bank, 2016). Even though this is a large number, it only account for about 40% of the world's population (World Bank, 2016), and this illustrates just how important it is to continue a secure and regulated digitalisation to include everyone in the digital revolution. Internet access can promote development and establishing democratic values in illiberal countries (World Bank, 2016). Nonetheless, Internet has resulted in digital technologies being unevenly distributed, and this digital divide must be closed for the revolution to endure (World Bank, 2016).

The definition utilised in this thesis defines Internet as a computer and mobile network providing a variety of information and communications services. Internet access implies the *ability* to connect to Internet, where accessibility, availability and affordability are vital factors.

In Myanmar the transition into a digital hub has occurred only in recent years, where lack of "digital legacy" has provided room for installing the latest technologies (Telenor, 2018). The country has seen a huge change from being one of the least digitalised countries before 2010, to becoming one of the most digitalised developing countries today (Calderaro, 2016; Telenor, 2018). The digital development has contributed to many opportunities, but also several challenges and risks. Internet is primarily accessed with a mobile phone, where smartphones account for most phone ownerships. On the one hand, the Internet and social media contribute to digital business opportunities and many women use the platform as a tool for empowerment but at the same time, has hate speech and harassment via social media become a huge problem. In economic terms, Internet access has contributed to economic growth, increased trade and digital financial solutions, but the lack of cyber capabilities and regulations restrict the effectiveness of these improvements. Statistically, Internet access demonstrates a digital progress in Myanmar, with number of Internet users and mobile phone owner continuously rising. Nonetheless, digital divides provide a huge challenge in ensuring universal and affordable access to Internet, where gender, demography and skills are relevant elements.

This thesis will further investigate the current situation of Internet access in Myanmar, and the challenges and opportunities it brings. The sociotechnical transitions approach will be used to assess how the Internet landscape is shaping in the country. The study involves three interviews and a wide variety of secondary sources, with a qualitative research design.

1.1 Problem statement

In Myanmar digitalisation has occurred at a rapid rate since 2011, when the democratisation process began. It has also seen a massive increase since the liberalisation of the telecommunications sector in 2013. Democratisation of the country brought less strict laws regarding freedom of speech and use of Internet. However, challenges surrounding censorship and imprisonment of people expressing themselves online must be addressed. There are both opportunities and challenges resulting from increased access to Internet, especially in a developing country such as Myanmar. However, the challenges the country are facing seems to outweigh the opportunities Internet brings. The problem to be addressed is therefore to identify the opportunities and challenges in relation to the current situation of Internet access in Myanmar, and to evaluate whether Internet is causing more unrest and instability than progress for development and the Internet transition.

The purpose of this study is hence to assess how increased Internet access has contributed to challenges and opportunities in social, economic and political terms, and to assess the current situation of Internet access in Myanmar.

1.2 Objective and Research questions

There are two objectives of this thesis that regards Internet access from two perspectives with underlying selective research questions.

Objective one is to assess the current situation in Myanmar regarding access to Internet.
Research question 1: What is the current situation on Internet coverage?
Research question 2: Who has access to Internet?
Research question 3: How is Internet accessed?

Objective two is to analyse what challenges and opportunities increased access to Internet in Myanmar has contributed to.
Research question 1: What are the political implications of increased access to Internet?
Research question 2: What are the economic benefits of increased access to Internet?

Research question 3: How do the digital divides explain the inequalities in access to Internet?
Research question 4: How is social media used?

1.3 Thesis outline

This thesis consist of five chapters, in addition to the conclusion. The first chapter introduces the study and explains the problem statement, objectives and the respective research questions. Next, in chapter two, the background on Myanmar will be investigated, where history, social aspects, political transition and digitalisation will be examined. This chapter attempts to give an overview of previous events that are relevant for the meaning of increased Internet access in Myanmar.

Chapter three introduces the theoretical framework, where the sociotechnical transitions approach is explained. The SDGs are described as a measure for the current situation of Internet access in Myanmar. The conceptual framework consists of definitions and related contexts of Internet, Internet access, ICT, digitalisation and development, where several elements are relevant. Lastly, the analytical framework is explained with a figure to clarify how the findings are analysed.

In the fourth chapter the methodology will be presented, and the qualitative research design and data collection will be explained. The data collection enlightens the process of selecting of informants, the interviews, secondary sources and the data analysis. The limitations will be presented in the last part of this chapter.

The last chapter, chapter five, consists of the findings and discussion. This chapter divided into the two objectives; current situation of Internet access, and the challenges and opportunities of Increased Internet access in Myanmar. Because the findings are numerous, the discussion is provided in the sub-chapters, but the final discussion is presented in relation to the sociotechnical transitions approach at the end of the chapter.

Lastly, the conclusion will sum up the findings and discussion, followed by the reference list.

2. MYANMAR BACKGROUND

Myanmar is a relatively large country with a population of 55.62 million people as of July 2018 (CIA, 2019), and covers 676,552 square kilometres (BBC, 2018 c). The capital is Nay Pyi Taw, but the largest city is Yangon (CIA, 2019). 70% of the total population of Myanmar lives in rural areas (World Bank, n.d.). Even though Myanmar is rich in natural resources and covers a large area, it is considered one of the least developed countries in Asia (World Bank, 2018). The digitalisation is contributing to significant changes and developments, but challenges remain.

In a 2013 study, Myanmar was deemed the second least digitalised country in the world in terms of number of Internet users and mobile subscriptions, with only North Korea coming out worse (Calderaro, 2014). The political transition that occurred in 2010 has contributed to many changes. This has resulted in a digitalisation process connection both the population of Myanmar to each other and to the rest of the world.

With digitalisation and increased access to Internet, the population of Myanmar has a huge potential to improve. Internet, social media and mobile phones give opportunities for civic society, activists and politicians to share their ideas and missions. The economy has the potential to grow significantly with digitalisation and new, advanced technology, and improvements in ICT and telecommunications in Myanmar could enhance many aspects of the life of citizens (Human Rights Watch, 2013).

Nonetheless, there is another side to this story and there are several aspects that are important to understand in order to further assess the digitalisation process in Myanmar. This chapter will first explain the historical background form the end of the British rule in Myanmar in 2948 until 2010. Secondly, the political transition from 2010 until today will be described. In the third sub-chapter, the social aspects, such as urban, rural and ethnic minorities will be examined. In the last part of this chapter, the digitalisation and history of censorship will be discussed.

2.1 Historical background (1948-2010)

Looking back in time, the changes that has occurred in Myanmar have contributed to shape the country. It was a British colony until 1948 and was considered a democracy until a military coup in 1962 (Xu and Albert, 2016). Myanmar was under the control of the military until the beginning of the political transition in 2010 (Kipgen, 2016: 8). The military coup of 1962 introduced many changes; the country became a single-party state controlled by the

military-led *Socialist Programme Party*, and the economy was nationalised (BBC, 2018 a). The military junta also introduced a ban on independent news outlets (BBC, 2018 a). Further changes were introduced through a new constitution of 1974, where policies became isolationistic (Xu and Albert, 2016). At the same time, The People's Assembly was established where the armed forces did no longer hold the same level of power, however Assembly was led by previous military leaders (BBC, 2018 a).

The country had experienced massive food shortages, protests and decreasing living standards in the years leading up to 1988. In August that year, the *888 democracy uprising* began, which caused major unrest in the country resulting in a large number of deaths (Kipgen, 2016, p. 20). In 1989, the military regime decided to change the official name of the state from Burma to Union of Myanmar, as Burma was associated with the colonisation era and the change was therefore regarded necessary for the now independent country (Xu and Albert, 2016).

In 1990, an election was held that was considered mostly free and fair, which surprised many (Kipgen, 2016: 21). The National League for Democracy (NLD) won most seats in the Assembly, and the support for the party's leader Aung San Suu Kyi was massive (Kipgen, 2016: 21). The democratically elected NLD demanded that the military-backed party would step down, but their disappointment in the election result made them refuse to hand over power (Kipgen, 2016: 21). The military answered by arresting several representatives from NLD, and the political tension in Myanmar was significantly heightened (Kipgen, 2016: 22).

Myanmar became a member of the Association of Southeast Asian Nations (ASEAN) in 1997 (Kipgen 2016: 58). Since that time, the Association has reported its dissatisfaction with some of the Myanmar government's actions, especially during the Saffron Revolution (which will be explained later on) (Thuzar, 2017). Under the military regime, Myanmar had a passive and reactive role and did not assert any strategic diplomatic power (Thuzar, 2017). Cribb (1998) argues that by granting Myanmar a membership, ASEAN's relationship to the West became very strained, and the Association had been recommended not to do so. Nonetheless, ASEAN regarded the country as resourceful, especially with natural resources, and was concerned that China would take advantage of Myanmar if they did not (Cribb, 1998).

During the 2000s, there were a range of events that have been of importance for the political transition at the end of the decade. The Saffron revolution in 2007 had a huge impact because the Internet was used as a tool for activists and civilians to gather and to share information within the country and to communicate with the outside world (Chowdhury,

2008). In 2008, the Cyclone Nagris killed 140 000 people, and this became widely publicised around the world due to the Myanmar government blocking international aid (Xu and Albert, 2016). In 2008, Myanmar also voted on a new constitution, which won a significant majority, but the vote was regarded as fraud by several activist groups (Xu and Albert, 2016).

Historically, Myanmar has several times become a prime example of how a country has limited the rights of their inhabitants. The house arrest of Aung San Suu Kyi and the Saffron revolution were especially regarded as important cases that opened the eyes of people across the globe, and laid attention on human rights in Myanmar, but also everywhere else (Keefer, 2012).

2.2 Political transition since 2010

From 2010 until this day, Myanmar has transformed from a military dictatorship to a formally democratic state (Jones, 2014). In the 2010 election and with the new constitution in place, the military junta made a promise to slowly democratise the country once again (Kipgen, 2016: 75). In 2011, the military junta was dissolved, and a civilian parliament was established (Xu and Albert, 2016: Kipgen, 2016). This also included appointment of a president, Thein Sein, a former military general, who supposedly represented the civilians (Xu and Albert, 2016). The process towards a civilian parliament also called for many reforms. Among those were amnesty for most political prisoners (even though this occurred over several years), lessening of censorship, and efforts to make peace with ethnic rebel groups (Xu and Albert, 2016). The year after, in 2012, there was a by-election of parliament seats where NLD won 44 out of 46 seats (Xu and Albert, 2016). The NLD is led by Aung San Suu Kyi who has fought for a freer and less isolated Myanmar for decades, and had been in detention since 1989 until 2010, both in prison and under house arrest (Kipgen, 2016; Xu and Albert, 2016, Human Rights Watch, 2010).

During the same year, several economic reforms occurred, and the government's role was reduced in serval sectors (Xu and Albert, 2016). That included the telecommunications sector, and the market was later liberalised to include foreign telecommunications companies' involvement in 2013 (A4AI, 2015). A new foreign investment law was passed, and FDI increased by $7.1 billion from 2010 to 2015 (Xu and Albert, 2016). The opening for foreign investment was a huge step for Myanmar to be included in the international market. According to McKinsey, Myanmar's economy can potentially increase to $200 billion in 2030, from $45 billion in 2010 (Xu and Albert, 2016).

The declining censorship that occurred in 2011 resulted in abolishment of censorship of the Myanmar's media in 2012 (BBC, 2012). Before this, all work by journalists had to be submitted and approved before publication. However, newspapers and journalists were given guidelines on how to write about sensitive or controversial topics and had to write within those terms (BBC, 2012). The reform also gave the population access to more Internet websites than previously (BBC, 2012).

The election of 2015 was an important milestone in the political transition of Myanmar. This was the freest election since the democratisation process started and was also considered fair (BTI, 2018). Even though the election was considered credible, there were several issues. First of all, the military had 25% of seats in the lower and upper houses, as is mentioned in the military-drafted constitution, where unelected military representatives were allocated seats (BBC, 2015). The military did also have veto over constitutional changes (BBC, 2015). Secondly, Muslims were discriminated against during the campaigning before the election and were denied the chance to run for Office due to uncertainty of citizenship (BTI, 2018). There was an undertone of ultra-nationalist Buddhism during the election campaigning (BTI, 2018), which to some degree undermined the results, even though the election was ruled credible.

The result of the election was a landslide win for the NLD (BBC, 2015), with Htin Kyaw as the first civilian president (BBC, 2016). Aung San Suu Kyi could not become President herself because of a clause in the constitution prohibiting persons with children holding another citizenship, as hers hold British citizenship (BBC, 2016). The clause is said to be tailored against her (BBC, 2016). Nonetheless, Aung San Suu Kyi could still hold power in the government as State Counsellor, similar to Prime Minister and *de facto* head of state (The Guardian, 2018).

There was a new by-election in 2018, where it was clear that the NLD had lost votes compared to the election in 2015 (Reuters, 2018). The neglection of ethnic minorities and the conflicts that has occurred was regarded as the reason, as the votes lost were primarily from ethnic minorities (Reuters, 2018). Earlier in 2018, Htin Kyaw resigned and a new President was chosen by the Parliament in March. The new President is Win Myint, a close adviser to Suu Kyi (BBC, 2018 b).

2.3. Social and cultural aspects

There are some relevant factors when assessing the social aspects of Myanmar First of all, the divide between rural and urban populations, because of the difference between their opportunities. Secondly, the ethnicities, religions and cultural differences, because this has been a challenge in Myanmar for a long time.

Myanmar consists of mostly rural or non-urban populations (ITU, 2012), but as mentioned, the largest population density is found in Yangon where more than 5 million people live (CIA, 2019). The population density is the largest in states where urban capitals are situated, such as Mandalay, Bago and Nay Pyi Taw, in addition to Yangon (MIMU, 2014). The population are, as mentioned, divided between rural and urban areas, and there are also a large share of the population living below the poverty line (World Bank, 2017). The poor most often live in rural areas, where infrastructure is even more limited than the rest of the country. More than 30% of the population live below the poverty line, and in rural areas almost 40% are considered poor, compared to 14% in urban areas (World Bank, 2017).

Myanmar is a country where several ethnic groups reside, there are believed to be 135 different ethnicities within the country (Kipgen, 2016: 11). These are divided into Burmese and non-Burmese, and non-Burmese includes several ethnic minorities (Walton, 2013). Before the colonisation by the British, many of the ethnic minorities, that are by some considered non-Burmese, resided in areas that had not previously been regarded as part of Myanmar (Kipgen, 2016). These areas had been independent kingdoms and their territories were referred to as "Frontier Areas" (Kipgen, 2016: 8). It was the British, as colonial power, who regarded the ethnic minorities and the Burmese as belonging to the same state (Kipgen, 2016: 8).

The country is divided into seven states and seven administrative areas that are, more or less, constructed by ethnicity (Holliday, 2007). The Burmese language, Buddhism and the Burman ethnic group are officially what constitutes who are considered *Burmese.* While this is the largest ethnic group, and in addition there are seven other ethnic minorities (BTI, 2018). The minorities in Myanmar are still fighting for acknowledgement for their religion, customs and languages (BTI, 2018). According to Walton (2013), differentiated treatment of Burmese and non-Burmese is institutionalised, and this is a result of the military government's long battle with the ethnic minorities. An example is that the political reforms after 2011 have in some cases not benefitted the non-Burmese people, and even though most

Burmese have enjoyed a more open and free country, some minorities have rather experienced increased repression (Walton, 2013). Kipgen (2016: 14) argues that colonialism could be blamed for the huge ethnic division in Myanmar, and that the conflict between ethnicities was therefore enhanced after the independence due to the differences in culture, language, customs, etcetera. The integration of ethnic minorities was an issue that the government did not acknowledge after the independence, and negligence of the ethnic armed groups and their demand for autonomy resulted in unrest, which is still present today (Kipgen, 2016: 18).

The country consists of around 90% Buddhists and 3-4% Muslims (Calderaro, 2016), and the small population of Muslims have been alienated from the society. There have been many violent conflicts between ethnicities, and especially between Buddhists and Muslims (Calderaro, 2016). The ethnicities are often differentiated according to religion or being Burmese and non-Burmese, where Burmese are mostly Buddhists (BTI, 2018). Several ethnic areas are controlled by armed groups, especially at the borders to China and Thailand, and these areas are regularly in unstable situations (BTI, 2018). In 2015 under the Thein Sein government, a ceasefire agreement was drawn between the government and several armed groups, but there are still some groups that have not signed the agreement and the situation in these areas are uncertain (BTI, 2018). The groups that signed the agreement where quite weak, and those who are militarily stronger are yet to sign. There are still 7 out of the 15 armed groups in the country that has not signed the ceasefire agreement, and the ethnic conflict is therefore not solved (BTI, 2018).

The largest ethnic conflict in Myanmar in recent times is regarding the Rohingya Muslims. The conflict between ultra-nationalist Buddhists and Muslims have long been a challenge, but in 2012, violence against the Rohingya Muslims escalated, leaving many displaced (BTI, 2018). The issue can be traced back to the Citizenship Law that was created in 1982, where Burmese citizens are divided into those who lived in Myanmar before the colonisation by the British, those who moved into the country before independence, and those who came after the independence (BTI, 2018). The Rohingya Muslims are therefore considered non-Burmese and do not hold official citizenship, even though many have family roots dating back to before the colonisation and independence (BTI, 2018). The political rights of Muslims have not been acknowledged, and this was evident during the 2015 election (BTI, 2018).

2.4 Digitalisation and censorship

Digitalisation has in general been lacking in Myanmar compared to other countries in the region, and access to Internet has been very limited and introduced later than in neighbouring countries (A4AI, 2015). As a country that has developed from an autocratic and isolated country, it is important to ensure that this process is based on the populations' basic rights (Calderaro, 2016). Due to the country's state of isolation from the outside world, lack of competence in policy making regarding access to Internet has become a challenge (Calderaro, 2016). Limited understanding of access to Internet as a public good has created uncertainty and confusion for both government and population. With democratisation and liberalisation, the international community are increasingly capable of assisting (Gjesvik and Schia, 2018). International assistance with capacity building of Internet can be an essential factor for the further digitalisation process in Myanmar (Gjesvik and Schia, 2018).

The first email service was introduced in 1997 and the first public Internet access was in 1998 but was in control of the government and people needed a permission to use the service (Troester, 2001). This implied that people not approved by the government had to post information about the country from Internet sources outside of the country (Human Rights Watch, 2013). As of late 2000, the government was the only provider of Internet in Myanmar (Troester, 2001). In 2011, Freedom House (2011) reported that there were two main Internet providers in the country, both controlled by the government.

When Internet was established in Myanmar, the military junta was in charge, and that resulted in a very sceptical approach to Internet, but also to ICT in general. Information flows were significantly controlled, both information that the population could access from abroad and the information that was sent from within Myanmar (Human Rights Watch, 2013). People experienced strict penalties for expressing anything against the government, military, or similar, online (Human Rights Watch, 2013). The Internet did introduce a more accessible platform where activists and civic society could express their ideas and thoughts and reach people across the country and abroad. However, this also contributed to people being routinely arrested and incarcerated for criticising the government, or accessing without permission (Human Rights Watch, 2013).

In addition to the fear of being arrested due to use of social media and/or expressing controversial thoughts online, there were also several other restricting mechanisms used by the government in order to limit the population's use of Internet before 2011 (Freedom House, 2011). For example, according to the Computer Science Development Law of 1997,

owning an "unregistered computer modem and connection to unauthorised computer networks" could be punishable with prison time up to 15 years (Freedom House, 2011:77).

Censorship has been widely used by the government, and there has also been several situations where the government has shut down the Internet and phone lines completely or partly (Chowdhury, 2008; Freedom House, 2011; Calderaro, 2014). Certain words such as 'human rights', 'Burma' and 'military government', were censored or a cause for blocking of a website, and some URLs were also completely blocked (Freedom House, 2011). A widely used example is the case of the Saffron revolution in Myanmar. This was an uprising that started in 2007 and was the first one in almost 10 years. The revolution was firstly associated with government ending subsidies of diesel fuel and natural gas, which resulted in significantly higher prices (Xu and Albert, 2016). This caused protests in Yangon, and quickly spread across the country (Chowdhury, 2008). The government shut down Internet access for the whole country and international mobile phone connections were disabled, resulting in citizens being cut off from the rest of the world for almost two weeks (Chowdhury, 2008). This was done to limit information about the revolution and uprisings to reach international press, and to limit foreign countries from intervening (Chowdhury, 2008).

There have also been several examples similar to the Saffron Revolution in later years, especially during sensitive times for the country. It is reported that before and during the election in 2010, many news sites, blogs, and similar, were blocked to limit the population from reading negative and controversial news about the election, the government and the political parties (Freedom House, 2011). This type of censorship is associated with withholding information from the population in order for the government to gain more legitimacy, however, this can also backfire (Bito et al, 2013). The Myanmar government has in several occasions used censorship, either by blocking Internet access completely or slowing down the bandwidth (internet speed) temporarily, to limit information coming out of Myanmar and information coming into the country from abroad (Freedom House, 2011).

The largest hinders to access to Internet have been the cost and the restriction from the government. In year 2000, it was reported that the cost of a SIM card was around US$5000, and very few Burmese could afford that (A4AI, 2015). The price level was relatively high until 2014, though low compared to year 2000, until after the liberalisation of the telecom market, when the price level began to decrease drastically (A4AI, 2015). A4AI (2015) reports that the price of a SIM card in 2015 was equivalent to 1% of the cost in 2013. Due to the large share of rural populations in Myanmar, infrastructure for Internet and mobile phone service is a challenge. This is also relevant as a large portion of the poor live in rural areas,

and access financially to Internet (including a mobile phone) is therefore still difficult (CSO et al, 2018). The populations that live in the borderline hill and mountain areas are especially prone to affordability and availability challenges (World Bank, 2017 a).

In 2012, the government of Myanmar announce that the telecommunications sector would be liberalised and introduced a competition for licences from international telecommunications networks (A4AI, 2015). Telenor (Norwegian) and Ooredoo (Qatar based) won licences and was established on the telecom market in 2014 (Calderaro, 2014). This was after a new Telecommunications Law was passed in October 2013, as this was necessary in order for international companies to establish networks in Myanmar (Dasand and Hudson, 2017). Ooredoo and Telenor were committed to connect 90% of Myanmar's population in only 5 years, where Ooredoo focused mostly on training in ICT skills, while Telenor was focused on rural populations where the digital divide is the largest (Calderaro, 2016).

As of 2016, there are four telecommunications operators in Myanmar. In addition to Ooredoo and Telenor, there are Myanmar Posts and Telecommunications (MPT), a state-owned company, and MECtel, which is subsidised through military-led Myanmar Economic Corporation (Nyunt, 2016).

An issue that has been connected to the liberalisation of telecom market and licencing of telecom companies is human rights and the violations the Myanmar government has committed. Because of censorship and limitation to freedom of expression for the population, there were concerns when international companies were to be involved in the telecom market (Human Rights Watch, 2013). It was made clear that the two companies had a huge responsibility to protect and ensure digital freedoms for the Burmese population (Calderaro, 2016). Ooredoo has previously been reported to censor Internet on behalf of governments and do not have any clear policies on privacy and freedom of expression, Telenor, on the other hand, has clear guidelines and policies for freedom of expression and rights to privacy (Calderaro, 2016).

The use of social media has increased significantly since the democratisation process began. Blogs were common before 2010 and the democratisation, because these were often more accessible than other platforms under the military junta (Einzenberger, 2016). After 2011, Facebook became accessible in the country, but before that the time there was barley any users of the platform in Myanmar (Caryl, 2015), and it became the main social media platform in the country. Since then, Myanmar Times (Trautwein, 2016) reports that there

were 9.7 million Burmese Facebook users in 2016, a number that increased drastically in only a few years.

With the increasing access to Internet in Myanmar, there is also a major focus on cyber security concerns, especially from the international audience (Gjesvik and Schia, 2018). Cyber security can be a challenge for governments, organisations or businesses, and for individuals. Cyber security framework has to be addressed and implemented sufficiently for the further progress in Internet and for development in Myanmar (Gjesvik and Schia, 2018).

3. THEORETICAL FRAMEWORK

The theoretical framework will consist of three parts; introduction of the theoretical approach, which is technological transitions; the conceptual framework, which is a literature review of relevant concepts and the contexts; and lastly, the analytical framework explaining how the study is analysed. This chapter illustrates how digitalisation, such as increased access to Internet, is connected to relevant concepts and how the technical transitions and analytical framework can contribute to explain and assess digitalisation processes within a country.

3.1 Technological and sociotechnical transitions

Technological transitions (TT) is defined by Geels (2002) as "major technological transformations in the way societal functions such as transportation, communication, housing, feeding, are fulfilled" (Geels, 2002: 1257). Geels further explains that these transitions do not only involve the pure technological changes, but also the changes in elements surrounding these technological changes, such as regulations and infrastructure. When explaining TT, it is important to explain what technology is and Rip and Kemp (1998) explain that technology can be regarded as tools. In this sense, technology as tools are often "coming in from the outside, diffusing, and being taken up for its overt function" (Rip and Kemp, 1998: 330). Important to point out, is that technology is not only tangible tools, but are also "…composed of materials and components, combined into devices and linkages, that in turn, are combined into a working system" (Rip and Kemp, 1998: 330). Rip and Kemp (1998) further explain that technology can be "configurations that work", and these configurations are relevant in the explanation of TT because it can be explained as "change from one sociotechnical configuration to another…" (Geels, 2002: 1258). Geels explains that these *configurations* are "a heterogenous set of elements" (Geels, 2002: 1257), and in that regard realises a function.

From the explanations from Geels (2002) and Rip and Kemp (1998), technological transitions can be understood as system changes or system innovation. System innovation can often be interpreted as innovation on the level of a firm (in management and organisation), but Geels (2005: 1) explains that it can also be understood at a societal level surrounding the societal functions. In this regard, skills and infrastructure is vital elements in the process, which Rip and Kemp (1998) acknowledge.

Within the notion of TT, there are also socio-technical transitions, which further explain how the society is affected by technological transformations. Geels (2010) explains

that system changes that can be considered socio-technical transitions do not only "entail new technologies, but also changes in markets, user practices, policy and cultural meaning" (Geels, 2010: 495). Geels (2002: 1259) stresses the importance of "linkages between technical and social elements" which will provide stability in the regime and landscape. He further explains that sociotechnical change can be a progression of "shifting assemblies of associations and substitution, a reweaving of elements" (Geels, 2002: 1259). Van den Ende and Kemp (1999: 838) explain that in sociotechnical progress "the development and use of technology proceeds in tandem (but not necessarily in harmony) with social, economic and institutional change". Smith et al (2005: 1491) adds to this, and explain that the use of regimes acknowledges that "firms and technologies are embedded within wider social and economic systems". From the academics' outline of the importance of sociotechnical perspective it is apparent that technical transitions cannot be understood without the social aspect, which includes political, cultural and economic aspects.

When using TT as a framework for analysis, it is essential to further explain the multi-level perspective that is used in the analysis (Kemp, 1994; Rip and Kemp, 1998; Van den Ende and Kemp, 1999; Geels, 2002; Geels, 2005; Geels, 2010). This perspective approach technological change on three levels: sociotechnical landscape, technological regimes and technological niches (Geels, 2002; 2005; 2010). Terms to explain this perspective differs among academics, but Geels' terms will be ustilised. The multi-level perspective combines perspectives from several fields, such as innovation studies, science and technology studies, and evolutionary economics, which strengthens the usefulness of the perspective (Geels, 2005: 75-6).

Technological regimes are explained by van den Ende and Kemp (1999: 848) as the embedded rule set of sociotechnical developments, and these are "configurations of science, techniques, production routines, institutions, and engineering and social practices that are labelled in terms of technology". The regime explains the existence of technological trajectories and is the "cognitive routines that are shared by engineers and designers in different companies" (Geels, 2005: 77). Rip and Kemp (1998) include that skills, infrastructures and institutions are similarly vital factors in the technological regime.

Formal and normative rules are central to stabilise and influence technological trajectories, and these rules can be difficult to change through technological transitions (Geels, 2005). Rules, in this sense, are often established in society to coordinate action and interaction between humans, and by introducing technological change these rules might be

changed simultaneously. Both Rip and Kemp (1998) and Geels (2005) explain that technological regimes can therefore be considered as set of rules, and in that sense will the regimes contribute to change existing rules within a society in the technological transition. Reconfiguration, in a stepwise process, characterises the regime within the technological transition (Geels, 2002), and this process can be related to the reconfiguration of rulesets in the society.

Technological niches (also called novelties) explain how radically new technologies emerge and infiltrates the technological regime. Niches are hence radical innovations that take place in the technological market, and are often expensive and low performing (Geels, 2005: 79). However, the niche level can be interpreted as a 'breeding ground' for technological innovations where a learning process for both suppliers and users take place (van den Ende and Kemp, 1999). The niches occur at the level of technology companies or laboratories (van den Ende and Kemp, 1999). Geels (2002: 1261) explain that niches are necessary in technological transitions because "they provide the seeds for change". He further supports this by saying that niches provide grounds for social networks building and development of innovations. Niches occur under existing technological regimes and sociotechnical landscapes, but through this process can influence changes in the two wider levels (van den Ende and Kemp, 1999).

The last level of the multi-level perspective is the sociotechnical landscape. The technological trajectories are located here and consists of *external* trends that are relevant for the regime (Geels, 2005: 78). Geels further explains that the landscape can contain economic growth, cultural and normative values, environmental issues, among others, but do also include physical infrastructure. These are hence deep structural changes (Geels, 2002). Geels (2005: 79) introduces two types of changes in the landscape. Firstly, there are changes in ideologies and political culture, or cultural and demographic changes. These are considered slow processes. On the other hand, there are rapid changes, which can be cause by wars or economic depression, among others.

Geels (2002: 1261) illustrate that the relationship between the three levels can be regarded as a "nested hierarchy". The niches are the micro-level where seeds for growth are planted, the meso-level is the technological regimes where stability and development of technological change occur, and lastly, the landscape is the macro-level and where external factors are changing and adapting (Geels, 2002; van den Ende and Kemp, 1999). Hence, innovations at the niche level can evolve within existing regimes, which, in turn, will slowly transform the sociotechnical landscape (Rip and Kemp, 1998). Smith et al (2005) suggest that

regime changes, can also be influenced by social change, this can for example be situations where society pressures change for technological advancement and for innovation, rather than from the technology sector. This can be related to changes in consumer culture and the needs of individuals, rather than that of society. This can similarly influence changes and progress in the sociotechnical landscape. Important to mention, is that the seed for change can be planted at any level of the multi-level perspective (Geels, 2002). However, radical innovations are mostly at the niches level while innovations forming on the other two level are usually incremental (Geels, 2002). Change in consumer culture can be an example here, because this will not necessarily be considered niches, but rather the regime level changes or changes in the economic and political landscape.

Using an example relevant to this study can clarify the approach further. Van den Ende and Kemp (1999) use the case of the computer regime and how that grew out of existing regimes. They conclude that "the digital computer regime grew out of existing computing regimes, and developed into a new regime with its own distinctive technological possibilities, user practices, institutions, organisational context and range of applications" (van den Ende and Kemp, 1999: 833). Previous knowledge and user-supplier relationships help shape the new regimes that emerged, and the increasing demand for computers was additionally an important factor due to expectations of what functions the computer had.

There are some weaknesses to the technological transitions approach. Geels (2005) recognises that the multi-level perspective cannot necessarily explain replacements of technology, which can therefore be confused when utilising TT as an analytical framework. He explains that the framework does not explain the relationship between existing regimes and the emerging, but focuses rather on *understanding* the emergence of technologies. Genus and Coles (2008) are not convinced that the multi-level perspective is an effective tool for analysis and introduce several limitations. They suggest that the definition of transitions is challenging, due to the question of where the start and endpoint is. Further, they argue that the difference between a renewal of system and a transition, especially radical, is difficult to distinguish. In conclusion, Genus and Coles suggest that the criticism of the multi-level perspective "indicates limitations thereof to generate rich and insightful accounts of transitions" (2008: 1444).

3.2 The Sustainable Development Goals

Looking at the United Nations Sustainable Development Goals (SDGs) in relation to access to Internet, it is clear that every goal is dependent on, or could be improved through, digitalisation. As the SDGs suggest, the purpose is to sustain the world and prepare the people for the future. Sustainable development can be explained as the "process of ensuring that the present development is sustained and maintained for the future" (Olise, 2010). The future is rapidly advancing technologically, and that does also include digitalisation. For developing countries to develop further, it is therefore essential that digitalisation, used as a tool to guarantee the SDGs, is adequately established. Olise (2010) uses the Millennial Development Goals (MDGs) for analysis and explains that ICT can be very important in actualising goals for development in many sectors, such as education, health, agriculture and business. Because the SDGs are also covering these issues, only to a larger extent, the importance of ICT and digitalisation is still very relevant. A report from 2017 by the International Telecommunication Union (ITU) explains the importance of ICT for every sustainable development goal and stresses the importance of 'getting everyone online' (Benson Wahlén, 2017). A report by the World Bank in 2016 emphases how countries should make Internet accessible and affordable for all, and stresses that by doing this the SDGs will be easier fulfilled (World Bank, 2016).

There are four goals in which the targets mention access to Internet and ICT as indicators, and essential for the goals to be fulfilled. ICT is mentioned in goal 4, 5, 9 and 17 (van der Valden, 2018). The topic of each respective goal is; education; equality; industry, innovation and infrastructure; and partnerships for the goals (UN, n.d. a; b; c; d). Access to Internet and ICT are illustrated in the targets as a measure of digitalisation. Goal 4, quality education, mention in target 4.4 that ICT training is vital for quality education and to be equipped for jobs, and the indicator evaluate the number of young people with ICT skills (UN. n.d. a). Goal 5, gender equality, include ICT in target 5B as essential for women's empowerment and the indicator is number of people who own a mobile phone, by sex (UN, n.d. b). Goal 9, industry, innovation and infrastructure, mentions in target 9C that access to ICT and affordable Internet is enabling this goal, and the indicator is number of people covered by mobile network (UN, n.d. c). Goal 17, partnerships for the goals, focuses on enhancing the enabling technologies, and especially ICT (UN, n.d. d). This include indicators on both number of people with fixed Internet broadband subscription (17.6.2) and people using the Internet (17.8).

The SDGs will be utilised as indicators to assess the current situation of access to Internet in Myanmar, and SDG 9 and 17 have been chosen as analytical tools. More specifically, targets 9.C,17. 6 and 17.8.

3.2.1 SDG 9

The sustainable development goal number 9 concerns industry, innovation and infrastructure. This goal is essential for economic growth and development and acknowledges the need for sustainable *technological* solutions for economic and environmental development (UNDP, n.d.). Goal 9 specifies that "investments in infrastructure – transport, irrigation, energy and information and communication technology – are crucial to achieving sustainable development and empowering communities in many countries" (UN, n.d. e). Target 9.C specifies the notion of ICT even further, and this target is to provide universal access to information and communications technology (UN, 2017), and the goal of this target is to "strive to provide universal and affordable access to the Internet in least developed countries by 2020" (UN, 2017). The indicator of target 9.C is to measure *the share of the population that is covered by mobile networks* (CSO and UNDP, 2017).

3.2.2 SDG 17

Sustainable Development Goal 17 presents *partnerships for the goals* (UN, n.d. d). This goal ensures that global partnerships are strengthened for sustainable development and concerns partnerships between civil society, governments and private sector (SDG tracker, n.d. b). There are as many as 19 targets for this goal, but two are relevant for digitalisation; target 17.6 and 17.8, which both discusses the importance of access to ICT and Internet.

Target 17.6 specifies the importance of cooperation and knowledge sharing in relation to access to science, technology and innovation, and the importance of a global technology facilitation mechanism (UN, 2017). There are two indicators within this target; science and technology cooperation and fixed broadband subscriptions. The last indicator is most relevant here. Indicator 17.6.2 use *number of fixed broadband subscription per 100 people* as a measure to evaluate technology penetration (UN, 2017).

Target 17.8 concerns strengthening and cooperate on science, technology and innovation capacity for the least developed countries (UN, 2017). The target focuses on estimating how many people in a country use the Internet to evaluate the degree of digitalisation, availability and accessibility of ICT and Internet networks. The goal of this

target is to "fully operationalise the technology bank and science, technology and innovation capacity-building mechanism for least developed countries, in particular information and communications technology" (UN, n.d. f). *The number of people using the Internet* (within a country*)* is a relevant indicator for this target, which can be found under target 9.C as well.

3.3 Conceptual Framework

To understand the study that will be conducted, it is important to explain terminology and the relation between the different concepts. There are some key concepts that are important to further define; Internet and ICT, and cyberspace, cyber security; digitalisation and development, how censorship is a hindrance, and the digital divide.

3.3.1 The Internet

The Oxford English Dictionary (2019) define Internet as "a global computer network providing a variety of information and communications facilities, consisting of interconnected networks using standardized communications protocols." Today, Internet is more than just a computer network due to the increasing importance of mobile network. As a general definition this is sufficient, and mobile networks will be included in the definition of Internet utilised in this study. The Cambridge Dictionary (2019) define Internet access as "the ability to connect to the Internet" and I argue that ability can consist of several factors; accessibility, availability, affordability. The three perspectives of *ability to connect* can explain the obstacles to access. The two definitions is used in this thesis.

The Internet was first established in 1962 but was at the time not the Internet we know today. By the late 1980s, however, the Internet was used by many researchers and developers, and soon became more common in other communities as a communication technology, mainly for used for e-mail (Leiner et al, 1997). Leiner et al (1997: 106) explain that "the Internet is as much a collection of communities as a collection of technologies" and the infrastructure was effectively built based on the needs to satisfy the communities. In the late 1990s, the Internet had become a commodity service that had become an "information infrastructure as support for other commercial services" (Leiner et al, 1997: 106). The first Internet website, along with the World Wide Web, was launched in 1990, and was accessible to everyone with a device that supported Internet. In 1995, 44 million people were already using the Internet and in 5 years that grew to 413 million users (Murphy and Roser, 2019).

According to data by Murphy and Roser (2019), 3.4 billion people used the Internet by 2016, and in South Asia alone there were 468 million users.

This illustrates how fast the importance and demand for Internet grew, and how it became an essential element in the digitalisation process. Today, the Internet has transformed the computer and communications world, and the computer, radio and telephone has "all set the stage for the Internet's unprecedented integration of capabilities" (Leiner et al, 1997: 102). The Internet has changes daily life of most people in the world, by changing "the way we work, spend our leisure time and communicate with another" (Murphy and Roser, 2019). The Internet has contributed to many new opportunities and has created a whole new idea of how people communicate. The Internet can contribute to access to information, access to markets and communication tools, and from a developing country's point of view these elements can be very beneficial.

The Internet is suggested to promote development in a causal relationship. According to the World Bank's "Digital Dividends" (2016), the Internet can promote development on three occasions. Firstly, the Internet can overcome information problems. This can be related to for example market access, which is significantly easier to access through Internet, and with a mobile phone, and this can again foster inclusion (especially financial). Secondly, the Internet can lead to lower transaction costs, which can then result in higher productivity of existing factors of production. The last is the enormous innovation potential the Internet promotes. This can lead to scale of economies and can be very beneficial for both small- and large-scale businesses (World Bank, 2016: 42-45). This illustrates how Internet can contribute to economic enhancement and growth for developing countries, as well as developed countries. Nonetheless, the Internet has not developed equally across the globe and there are diverging differences from developed and less or least developed countries. A digital divide has occurred with the increasing digitalisation and access to Internet, which will be discussed further below.

To evaluate the degree of Internet access, there are two important measures that indices and statistics use. Subscriptions to broadband is relevant because this illustrates the degree of demand for and, to some degree, the use of Internet. There are two types of broadband; fixed broadband and mobile broadband. Fixed broadband is defined by World Bank as:

"…the fixed subscription to high-speed access to the public Internet […], at downstream speeds equal to, or greater than, 256 kbits/s. This includes cable modem, DLS, fiber-to-the-

home/building, other fixed (wired)-broadband subscriptions, satellite broadband and terrestrial fixed wireless broadband" (World Bank, n.d.).

Fixed broadband is connected to two fixed sites where data is transmitted between and covers a fixed area. Mobile broadband, on the other hand, is Internet access through mobile networks, and is in theory not a broadband. Mobile broadband is Internet access via cellular networks, and this type of Internet use cell towers to transmit data from and to mobile phones, or other digital tools (ITU, 2019). The largest difference between the two is that fixed broadband has a higher speed (traditionally) than mobile broadband, but the mobile networks is continuously improving. It is important to note that mobile cellular subscriptions can be both with or without data packages and will also differ between using a smartphone or a 'keypad only' phone, and the availability of Internet access from the specific phone (ITU, 2019). It is therefore a difference between number of subscriptions and the actual usage of Internet.

Information and communication technology (ICT) is the term that has been used for several decades to explain the transformation from physical form information and communication, towards a digital technology form. ICT is considered modern computing, and the infrastructure and components that supports the computing system (Rouse, 2017). As the name suggests, ICTs are tools for access to information and for communication, and can include mobile phones, the Internet, personal computers (e.g. laptop), and because ICT is used to access the Internet, the two elements are inseparable. ITU reports that broadband (Internet) access and availability has become the vital indicator for ICT potential and performance in a country by 2017, and this indicates that broadband has become essential for economic and social development through ICT (ITU, 2017). ICT is crucial for developing countries to compete in the new digital world (Olise, 2010).

Due to the wide nature of ICTs and because the Internet can be regarded as part of ICTs, I have chosen to mainly address access to Internet. With that in mind, the tools that are necessary for Internet access are important elements. I will therefore consider mobile phone penetration as a factor of Internet access because most people in Myanmar use their phone for access (Ko Ko, 2019).

When measuring the extent of Internet usage and availability in a country the SDGs 9 and 17 can be useful. The indicators that are introduced in these goals, as mentioned above, are *number of inhabitants using the Internet*, *number of fixed broadband subscriptions per 100 people*, and *number of people covered by mobile network* (CSO and UNDP, 2017).

Internet and ICT can be measured from several perspectives, including Internet usage, mobile use, and broadband subscriptions, but demand of computers, range of Internet network within a country, mobile subscriptions, etc., are also all relevant indicators for ICT.

Another useful tool to evaluate Myanmar's progress is the ICT Development Index (IDI) provided by ITU. This index is based on three parts and 11 indicators in total. First, there is ICT use, which is divided into: fixed telephone subscriptions per 100 inhabitants, mobile-cellular telephone subscriptions per 100 inhabitants, international Internet bandwidth (bit/s) per Internet user, percentage of households with a computer, percentage of households with Internet access. Secondly, the indicators evaluate the ICT use: percentage of individuals using the Internet, fixed broadband subscription per 100 inhabitants, and active mobile-broadband subscriptions per 100 inhabitants. Lastly, is ICT skills: mean years of schooling, secondary gross enrolment ratio, and tertiary gross enrolment ratio (ITU, 2019). These three sub-indexes contribute to measure the IDI and evaluate the level of ICT and Internet access, infrastructure, skills, and usage. Important to mentioned, however, is that the indicators are slightly changed and has been improved to fit better to the usage of mobiles and Internet today. This change will be applied to the upcoming report in 2019, demonstrating IDI from 2018, while the numbers illustrated in this study will be from 2017 with the indicators explained here.

In relation to understanding Internet, cyberspace is important to define. In this regard, it is also relevant to explain cyber security and its importance for security online.

Cyberspace can be defined as "the realm of computer networks (and the users behind them) in which information is stored, shared, and communicated online." (Singer and Friedman, 2014). However, a definition of cyberspace can be difficult to totally agree upon, as cyberspace has change enormously since its beginning. Singer and Friedman (2014) explain that cyberspace is a global phenomenon, but it is nonetheless dependent on states and the boarders that surround a nation, which is important for developing countries. This is also relevant because cyberspace is constantly changing, and for countries to be able to have the same access to cyberspace, the countries must change with it. This is especially important considering that the level of digitalisation can vary from country to country, and particularly when comparing the Global North and the Global South. For the Global South to be able to develop at the same rates as the Global North in relation to digitalisation, cyberspace becomes a vital factor as information is shared and communicated online. Access to cyberspace does not only imply development technologically, but contributes to economic,

political and social development as well (Klimburg and Zylberberg, 2015). As a result of the huge effect cyberspace has on developmental aspects, it is essential in today's societies. Mitra and Watts (2002) predicted that cyberspace and the Internet would become as important as the radio and telephone was some decades ago. It can be further argued that it might be even more important, as information is now even faster shared through cyberspace.

Cyber security also becomes an essential component in this regard. Cyber security is the safety net around cyberspace, and therefore also digitalisation, and can be explained as "the organisation and collection of resources, processes, and structures used to protect cyberspace and cyberspace-enabled systems from occurrences that misalign de jure from de facto property rights" (Craigen et al. (2014: 17). Cyber security is also important in developing countries, but the lack of institutions and regulations regarding cyber security poses a challenge (Muller, 2015). Being a developing country without a sufficient cyber security system or the needed expertise of cyber space can be a huge vulnerability that other countries can easily exploit (Kundi et al., 2014).

3.3.2 Digitalisation and development

Internet is an important factor in today's digital revolution. The digital revolution is also referred to as digitalisation and this process explains how the world is transforming into a digitally based society. Digitalisation is a term that can be difficult to define, as it is a term that encompasses so much. It is also important to distinguish between digitisation and digitalisation. Digitisation means that information is transformed from a physical form to a digital one (van der Velden, 2018). Digitalisation is then a step forwards and is defined as "the increased connectivity and networking of digital technologies to enhance communication, services, and trade between people, organisations and things" (Linkov et al, 2018: 1). From these two definitions, digitalisation is a process where countries, in this context, will improve systems of money transfers (mobile banking), education, information sharing, taxation, and so on, by using digital tools or the Internet. By looking at digitisation, it is clear from the definition above, that this is the first step for developing countries, as they are moving from physical format to a digital one. However, looking closer at the transformation that is occurring now, the process is also what is defined as digitalisation, as they are using digital tools for education, it is used by governments to easier access information, businesses are more efficient by using digital tools, and so on. This is therefore not only limited to the two terms explained here, but it is about 'the information revolution'

that is taking place (Graham, 2011). Digitisation and digitalisation are parts of the information revolution by giving people easier access to information and to communication tools through technology. Digitalisation therefore also includes the development of the Internet and the possibilities that it can bring.

According to Barder (2012) development can be regarded as impact on humans, in relation to their income, but also development in their "choices, capabilities and freedoms". This will then be related to the progression of peoples' wellbeing, and something that can be regarded as a lasting change (Barder, 2012). For developing countries, it is usually related to social and economic development. This can be relevant in relation to digitalisation, due to its impact on development in both social and economic respect. According to Olise (2010), ICT and therefore Internet, is necessary for developing countries in order to achieve sustainable development. Internet and digitalisation (and ICTs in general) are part of the information revolution, and Graham (2011) explains how this can contribute to spreading democracy, to reduce poverty, and to decrease power of centralised structures.

There are many benefits of digitalisation for (developing) countries. As explained by Gjesvik and Schia (2018: 6), the very fast development of the Internet is "connecting even more people to an international world of business, discourse and entertainment". Digitalisation and connectivity (Internet) are contributing to growth in economic aspects, as well as securing political stability, as information is easier shared, and promoting social welfare. Schia (2018: 822) uses a different definition, which is more specific to this context, implying that it is a development where "polities and communities are produced locally, and become (trans)formed through their entanglement with external digital connections". When looking at developing countries in this context, digitalisation is a prominent phenomenon, as this can contribute to development in many aspects of society as the world has become digital. Access to digital technology can also contribute to reducing poverty by giving easier access to information as well as markets for small-scale farmers, for example (Schia, 2015). It is argued that the 'digital divide' can explain some parts of the divide between poor and non-poor today, as the poor can often be distinguished as those excluded from the digital world (Graham, 2011). This explains how it can be crucial for developing countries to be, or become, further connected and digitalised.

Even though there are many benefits to this phenomenon, there are also negative aspects and risks connected to digitalisation, especially in developing nations. By digitalising governments for example, there are several risks that can occur. In countries where there has been a rapid progress in the digital arena, this growth might not have been accompanied by

security systems, such as legal framework and institutions, that will ensure safety in the digital world (Muller, 2015). There is less capacity, both in private and public sectors, to handle challenges that digitalisation enhances, such as cybercrimes and attacks. This is because infrastructure for digitalisation is lacking. As digitalisation is happening in both public and private spheres, a threat is posed against governments and state institutions, as well as businesses, particularly in countries where infrastructure and regulations are lacking.

Another issue that is especially relevant in countries with authoritarian rule or are enduring a democratisation process, is censorship. Censorship is also relevant to define in order to illustrate how the Myanmar government has controlled the *informedness* of the population for a very long time. Censorship can be defined differently depending on the type of censorship, but in general Bitso et al. (2013: 167) define censorship as "a moral or legislative process by which society agrees to limit what an individual can do, say, think or see." Classical censorship is often associated with media filtering, but as the Internet has become the main source of information in recent years, censorship has changed. Censorship of the Internet can be unintentional or intentional, or caused by other restriction such as the digital divide, lack of skills or lack of access to ICT (Bitso et al, 2013). Internet censorship, or filtering, is according to Jamali and Shahbaztabar (2017: 408) a "mechanism designed to control online activity through filtering or blocking of particular parts or features of the Internet…". It is often associated with political control and censorship can result in populations being denied access to (certain) information, but also their ability to share ideas and opinions is restricted (Bitso et al, 2013).

In this regard, it can also be relevant to look at the inequality of access to information. As mentioned earlier, the digitalisation can also widen the gap between rich and poor, as digital tools, such as mobile phones and computers, are expensive. This also applies to infrastructural limitations of access to Internet. These goods are therefore not available to all, and this creates an inequality in access and availability (Graham, 2011). This can cause a digital divide.

3.3.2.1 The digital divide

The digital divide that occurs due to inequality in access and availability of Internet is becoming a huge problem all over the world, but mostly in developing countries. The digital divide is defined by Bansode and Patil (2011: 58) as "the gap between those with regular, effective access to digital and information technology, and those without this access". This

divide can be seen within a country, between poor and rich, and rural and urban populations, but it can also be seen between countries (World Bank, 2016). This illustrates how the digital divide is creating a new type of inequality and furthers the gap between the rich and poor all over the world, and not only in developing countries. This divide does result from a diverging access to ICT from the very beginning and has caused an "economic and socio-spatial segregation" (Graham, 2011: 211) in societies. The digital divide is related to several social aspects; ethnicity, demography, economic status, geography (Venkatesh and Sykes, 2011; Linkov et al, 2018).

The divide has transformed from the notion of access to ICT, to a divide in access to the Internet. This can be related to cultural, political and economic factors within a country, such as censorship of certain websites and blocked access to cyberspace (Graham, 2011). The digital divide can therefore also be caused by limitations created by governments, creating inequalities between citizens of different countries.

The digital divide can also be related to gender (Bansode and Patil, 2011; Linkov et al., 2018). As with gender inequality in general, digitalisation tends to favour men. This is especially the case in rural, and often poor areas of the Global South. It is even suggested that digitalisation can contribute to widening the gender gap in poor societies. An example is the mobile phone; according to an article in the GIZ Magazine, women are less likely to own a mobile than men, who as the breadwinner, is prioritised over women if only one person in the household can have a phone (Sambuli, 2018). According to a report by Alliance for Affordable Internet (2018), the gender gap in digitalisation is threatening global development today because women are often those who are left behind in both development processes and in digitalisation. The Alliance also suggest that gender inequality in other aspects of daily life, for example at work and in households, is the obstacle for women to be included in the digitalisation.

One last important aspect of the digital divide is digital and technological *skills*. People might have the access to Internet, but without skills to use these technologies, people are still being excluded from the digitalisation (Bansode and Patil, 2011), and this can be especially a problem in rural areas where these skills are especially lacking. It is clear from the differing definitions introduced, that the digital divide is a term used to explain several divides that occur due to digitisation and digitalisation.

3.4 Analytical Framework

The analytical framework for the thesis is built on several elements and contexts. Figure 1 illustrates how this framework has been utilised.

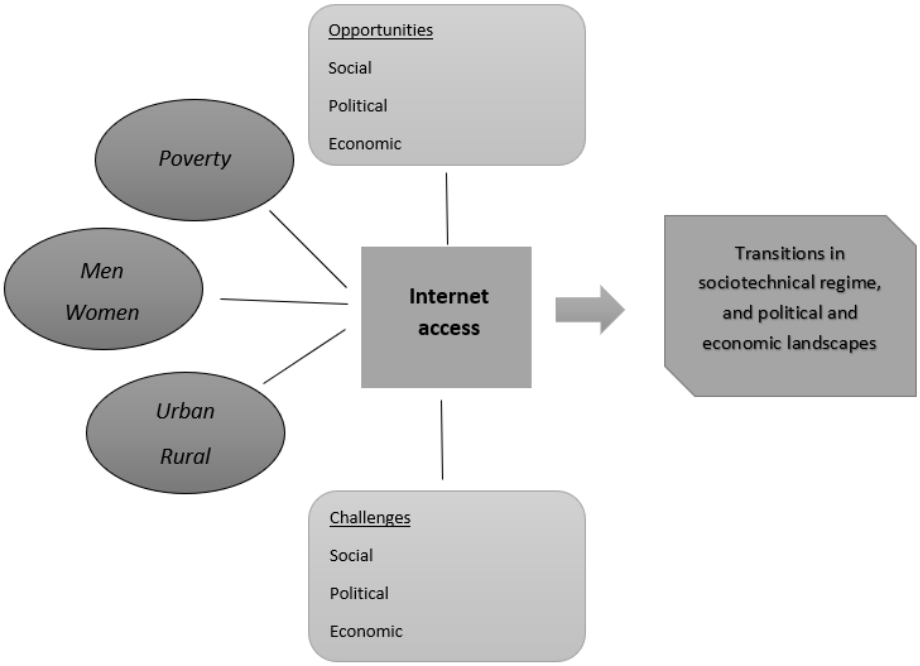

Figure 1. Analytical framework

The figure (figure 1) is divided into three parts, where part one is based on objective one; the current situation of internet access in Myanmar and the relevant factors for the research questions. Part two illustrates objective two where challenges and opportunities increased internet access has contributed to, and the three levels that these changes has occurred in. Lastly, these changes and factors related to increased internet access have contributed to changing the political and economic landscape in Myanmar, because of transitions within the sociotechnical regime related to Internet.

For the analytical framework, there are some indicators than can be relevant to use, especially when evaluating the current situation of Internet access in Myanmar. The SDGs 9 and 17 that has been introduced earlier, are particularly relevant for objective one.

4. METHODOLOGY

This section will explain the methodology of this master's thesis. The chapter is divided into five parts. The first part is the research design where the research method will be introduced and explained, and the qualitative method will be described. Secondly, the selection of research area is presented, which will introduce Myanmar as the case study and clarify why it is interesting to investigate. The third part is the data collection methods, which will further explain the qualitative nature of the study and introduce the primary and secondary data collection methods; the interviews and secondary sources. The fourth part presents the analysis methods, describing how the data collected were analysed and organised. Lastly, the limitations of the data collection and design will be discussed.

4.1 Research Design

This thesis is based on a research design that draws from qualitative research characteristics. The study is regarded to be qualitative as it assesses the effects on society and minorities within the Myanmar population. The thesis attempts to to gain a deep understanding of the situation regarding access to Internet in Myanmar. The analytical and theoretical framework illustrates two different angles in this study. Progress regarding use and access of Internet is discussed within an analytical framework, while the sociotechnical transitions approach illustrates how the society is affected and changed by such a process in a theoretical framework. Qualitative research is characterised by an inductive view, where research generates theory; an ontological constructionist view, where interactions between individuals are essential; and an epistemological view due to the interpretivist features in understanding the society (Bryman, 2012: 308). Quantitative research is a deductive method, where theory guides the study and is hence is tested. Quantitative methods are used in studies where generalisations are made and are often based on natural science models. This research method views the "social reality as an external, objective reality" (Bryman, 2012: 36). From the definitions, it is clear that this study is qualitative.

The approach to this study is inductive, which implies that observations and findings contribute to the outcome of a theory (Bryman, 2012: 26). The thesis attempts to illustrate through the findings how the theory of sociotechnical transitions can explain the situation that is occurring in Myanmar. This study follows an epistemological interpretivist path, where past experiences shape understanding of the new phenomenon. The historic and political background of Myanmar is very relevant in explaining the situation today. Important to note,

is that due to limited primary data, this study does not "get as close as possible to the participants being studied", which Creswell (2007: 18) argues is an important part of qualitative research. However, it is not particularly ontological constructionist, because the study does not focus extensively to understand interactions between *individuals*. However, the study does acknowledge that social phenomenon are created and affected through action by social actors, which constructionists argue (Bryman, 2012).

The thesis design is based on a case study of Myanmar and the implication of access to Internet. A case study is, according to Yin (2013: 321), "an in-depth inquiry into a specific and complex phenomenon ('the case'), set within its real-world context". In this study the phenomenon is access to Internet in Myanmar and the study will therefore be an in-depth inquiry into this issue. The case study of Myanmar is what Yin calls a *case study evaluation* and such case studies, he argues, can often be limited to "descriptive or even exploratory objectives" (2013: 322). The issue that can occur in such a case is that the outcomes of the analysis can result in *issues of internal validity* (Yin, 2013: 322), he argues that the technique to ensure that the case study is valid is to "capture the within-case patterns of configurations" (Yin, 2013: 322). This implies that there are several sub-cases to compare within the case study, where these within-case configuration are ensuring validity. In the case study of increased access to Internet in Myanmar, several aspects will be explored to validate the case and the findings.

4.2 Selection of study area

Myanmar was selected as a case because of the high level of access to Internet and due to uniqueness of the situation and development of digitalisation in the country. Myanmar was an isolationist state until 2010/11 and as a result, access to Internet was limited until the start of the democratisation process. This provides a very interesting case to study, because both the challenges and opportunities that Internet creates, differs from other countries.

In Myanmar the digitalisation process has been rapid, and the use of Internet and mobile phones has increased enormously in only a few years. In accordance with the democratisation process and a move towards an open society, digitalisation and access to Internet have become essential elements for modernisation. Before the democratisation process started the country was regarded as one of the least connected countries but since then, the country has acquired fastest growing smartphone markets (Gjesvik and Schia, 2018) and the mobile broadband is ranked among the fastest in the developing world (Telenor,

2018). With this significant transition towards a digital community, Myanmar is a prime example among developing countries where digitalisation and access to Internet are still in the developing phases. The within-case configurations that will be addressed in this case study are political, economic and social contexts of Internet access and its relevant transitions within a sociotechnical landscape.

4.3 Data collection methods

The data collection is based on primary data from interviews with key informants, and secondary sources. The data collection is therefore qualitative, because all data has been gathered either as in-depth interviews or secondary sources that has been appropriately analysed. Using both data collection through interviews as well as secondary data via several sources, ensures triangulation. Triangulation implies that one uses more than one "source of data in the study of a social phenomenon so that findings might be cross-checked" (Bryman, 2012: 717). Creswell and Miller (2000: 126-7) argue that triangulation is essential for validity of a study and does not only imply that there are more than one data collection methods, but rather a variation of "across data sources (i.e. participants), theories, methods (i.e. interview, observations, documents), and among different investigations". Because of the framework of the master's thesis, there is only one researcher, but the other variations are present in this study.

The research questions are divided into two objectives, with the respectively selected research questions. The objectives have a general character, while the research questions are narrower. Th research questions addresses the relevant elements that are illustrated in the analytical, conceptual and theoretical framework.

4.3.1 Selection of Informants

The selection of informants was based on several criteria: knowledge about Myanmar and the political environment; knowledge of access to Internet; knowledge of effects of Internet and social media. The three informants consisted of two representatives from interest groups; Peace Research Institute Oslo (PRIO) and Alliance for Affordable Internet (A4AI), and a previous master student at NMBU.

The process of selecting informants was purposive but was also based on their willingness to participate, and therefore convenient sampling. There were several other relevant informants that were contacted but were either not available or did not reply to the request. The selection of informants varied a bit. I came across A4AI in a report by ITU

while doing research, where their work was applied as a reference to Internet access in Myanmar. When searching their website for information I decided to contact them for further information, and they were willing to go on record as informant number 1. The second informant is from PRIO and was suggested by my supervisor, who found an article on use of social media in Myanmar. They were also willing to answer questions about their research and Myanmar. The last informant, number 3, is a previous student of my supervisor and the informant's contact information was provided through her.

4.3.2 The interviews

The study is based on three in-depth interviews with experts in different fields related to Myanmar and/or access to Internet. The interview objects were purposively chosen due to their field of expertise and knowledge. The purposive choice of interviewees ensure that those interviewed have specific knowledge on the topic of interest and are therefore considered informants. Purposive sampling is used in contrast to random sampling, and the purpose of this method is to ensure that the informants are relevant to the research questions (Bryman, 2012: 418).

The interviews were semi-structured but differed from all three interviews due to the different angles the informants contributed to. Semi-structured interviews implies that the interview is based on an interview guide, but the interviewee has some flexibility when answering, and the interviewer can also ask questions that arises during the interview (Bryman, 2012: 471). This was very useful during the interview because both the interviewer and the informants could talk freely, but had the guide to ensure that all pre-selected questions were answered. As mentioned, the three interviews were based on different topics within the field and that was useful during the analysis as the informants could, to some degree, answer the different research questions. The semi-structured interviews allowed the informants to discuss all the factors that they regarded as relevant for the topic, and allowed the interviewer to follow up the issues presented that was of particular interest.

Two of the interviews were conducted in person (face-to-face) and one on video chat through Google Meet. All interviews started with me explaining what my thesis is investigation and which issues that are most interesting to further explore. Which research question(s) their knowledge were useful for was also elaborated, and from there the interview continued in different directions.

The first interview with A4AI was arranged through Google Meet. This alliance is based in Washington DC and the interview could therefore not be conducted in person. Alliance for Affordable Internet, as the name suggests, works to ensure affordable Internet around the globe with a special focus on the least developed countries. Myanmar is one of the countries that they work in, where the alliance has contributed to cooperation between the government, private sector and civil society in establishing infrastructure for Internet. The informant from A4AI was able to contribute with information on the progress of access to Internet in Myanmar.

The second interview was at PRIO with a researcher at the institute. PRIO is a research institute based in Oslo, where peace is in focus. The Interview took place at their office and was very useful because of the sources they were able to provide me with. Researchers at PRIO is currently working on a study of how social media is relevant for ethnic conflicts that are occurring in the country. The interview was therefore mainly based on their research so far but did also cover other aspects of Internet in Myanmar.

The last interview was conducted at NMBU with a previous master's student who have visited Myanmar four times and wrote the master's thesis on Myanmar. The informant had many useful observations regarding Internet usage in the country, and could also provide general information about Myanmar from own research and observations.

Other than explaining where and how the informants were found/contacted, they remain anonymous through this thesis.

Because there were only three interviews that covered the primary data collection, secondary sources were broadly used to further gain knowledge and understanding of the subject at hand.

4.3.3 Secondary sources

Secondary sources were significantly used in this thesis. The study is based on wide range of sources to understand the situation in Myanmar today; to understand the historic and political transition that has occurred, and to analyse the effects of increased access to Internet after the democratisation. The reading process of the study have taken up most of the time spent doing the thesis, but has also provided me with a broad understanding of the country, the situation Myanmar is in now, and how Internet is an important aspect of the

democratisation process and at the same time challenges for the government and the population.

The secondary sources are primarily based on Internet research, and most secondary sources are accessible online today which provide easy access and a broader selection. The main definition of secondary data is that it is not collected by the researcher for the current study, but was collected for another purpose (Bryman, 2012: 715). The use of secondary sources can be divided into two categories; relevance for the theoretical framework, and relevance for the case on Myanmar.

When selecting secondary data for the case study there were several criteria that had to be fulfilled. While selecting sources and data, trustworthiness has been the most important criteria and evaluating the validity of the statistics and authors of the reports and articles. Statistics were mostly relevant for objective 1 regarding the current situation of access to Internet. The statistics were found through institutions' websites; World Bank, the UN and ITU, and institutions and organisations' reports; World Bank, ITU and A4AI. Telenor has also contributed with relevant statistics and information in their report *Realising Digital Myanmar* from 2018. The ITU and World Bank have most of the relevant statistics because of their cooperation with the Myanmar government, and there are several relevant reports that have been utilised.

For the second objective, reports on economic, political and social progress in relation to internet access has been utilised, in addition to academic articles, news articles and relevant statistics from the previously mentioned sources. The criteria for this objective is therefore broader but is related to the perspectives of changes in political, economic and social contexts in Myanmar.

Reports that have been used are mostly by companies, international institutions or organisations that either work in Myanmar or are local organisations. This ensures that their angle could be relied on, but it was important during the data analysis to remember that the reports might be nuanced by the intentions behind it.

The secondary sources, especially the academic sources, have mostly been access through Oria and NMBU VPN. The internet has allowed for libraries to be digitalised, accessible and available to students all over the world, which is a unique opportunity the Internet has created. There are many articles written on Myanmar and access to Internet, but there are unfortunately some issues due to outdated data for this study. On the other hand, secondary data allows for a longitudinal analysis (Bryman, 2012: 313), which can be valuable for a case study such as Myanmar.

There is a risk that secondary data is of poor quality, which is a consequence of using data collected by someone not being the researcher (Bryman, 2012: 316). This can be difficult for the researcher to realise, but for this thesis time and effort has been put into ensuring that the data is the best quality and from reliable sources.

4.3.4 Data Analysis

When analysing the collected data there was not one specific method that was used, but concepts were identified through the process. Data collection and analysis were conducted continuously which highlighted the patterns during the process of the thesis development. This explains a thematic analysis (Bryman, 2012: 13), where one can find new themes and relevant factors during the data collection period. The analysis of data can be regarded as analytical induction. This explains a method were the study starts with a rough research question and a hypothesis that explains the problem, through data collection and examination of cases the research questions will be confirmed or denied, and further data collection will be conducted (Bryman, 2012: 566). Analytical induction often arrives at an explanation specifying conditions sufficient for the phenomenon, but is rarely transferrable to other cases (Bryman, 2012: 567).

The interviews were transcribed immediately after they were conducted and was recorded to ensure that no information was missed. This allowed me to identify important elements during the process, and to identity similarities between the interviews and the secondary data collected. The ensure that the interviews were correctly understood, transcriptions were conducted two-three times per interview, and the data was analysed accordingly. This is important to avoid misunderstanding or misinterpreting answers from recordings (Bryman, 2012: 13).

Secondary sources were grouped according to their topic and relevance for the different parts of the study. The analysis of data was dependent on the framework; social, economic and political perspectives, in addition to the theories. The analytical framework illustrates how data has been categorised, both for secondary and primary data.

4.3.5 Validity and reliability

Validity and reliability have been discussed partially in previous sub-chapters, but these features are important to acknowledge so there will be a further examination into these aspects of the study.

Validity is the most important criteria of the research methods and design. Validity can be viewed from different angles, either from the data collection, from the case study, or from the sources. For the data collection, triangulation was as an important factor to ensure validity, and Creswell and Miller (2000) suggest that triangulation contributes to validity of information through different and multiple sources. In this case, validity is guaranteed through both triangulation of methods (several data collection methods) and a variation of sources. For case studies, Yin (2013) explain that triangulation is vital as there a variation of both sources and methods can strengthened the case and the findings. This is especially evident in case study evaluation where several sources and methods are used to accumulate overlapping data. Due to the use of both primary and secondary data in this study, triangulation is evident, and this can also be found in the extensive variation of secondary sources.

Reliability is less evident especially in qualitative research methods. Reliability is more common for quantitative data collection, because the term implies that there are repeatable result in the study (Bryman, 2012: 46). However, this can also be found in qualitative research. Bryman (2012: 46) explains that the term can also be understood as "whether the measures that are devised for concepts in the social sciences (…) are consistent". Golafshani (2003) suggests that in qualitative research reliability can prove the quality of the study and is therefore related to trustworthiness. Trustworthiness has been divided into four criteria; credibility, transferability, dependability, and confirmability (Bryman, 2012: 388-90). Credibility is whether the researchers result can be validated by the social group that is studied. Transferability entails that the study is intensive and a thick description of the group that is studied. Dependability concerns the concept of ensuring that the data and results are valid, often associated with an auditing approach. Lastly, confirmability is objectivity by the researcher, or as objective as possible.

This thesis is, as mentioned, based on a broad range of sources, from different angles and with different intentions. This ensures that the study is trustworthy. However, due to the limited time and as this is a master's thesis, auditing and validation by the population studied has not been possible.

4.5 Limitations

There are several limitations to the study that must be highlighted. First of all, time has been an issue for several reasons. Defining the problem statement and research questions

was very difficult, and unfortunately was too much spent on this rather than starting the research process. There are many angles one can investigate the issue of access to Internet from. Deciding on Myanmar as a case study was difficult because of the political issues the country has experienced and reliable sources were therefore difficult to find. Even though time has been an issue, I believe that the research that has been conducted is extensive.

Time was also an issue regarding the interviews. The interview with A4AI was only 30 minutes and that was a limitation because we did not have time to discuss all the aspects that was prepared in the interview guide. The interview at NMBU also had a time constraint, and although the interview lasted for 50 minutes the thoughts of the informant were very interesting and we could have spent more time discussing.

The next limitation was the small number of interviews conducted. Before I started the primary data collection, as envisioned a repertoire of around 10 interviews of different experts and relevant informants on the topic. Unfortunately, many people were not interested or available for interview. There were some contacts that were only willing to provide me with relevant material and referred me to their work on Myanmar, but they were not willing to be interviewed. Due to the low number of interviews, the qualitative character of the thesis is somewhat limited because the perspective of both experts and locals were lacking, and that secondary sources can only provide a partial impression of the situation in Myanmar.

Secondary sources are many, but there are few sources that are directly from the Myanmar government. The challenge was that many government documents that were either not accessible for me, or they were in Burmese. This limited the point of view from the government itself, and the thesis is therefore mainly based on expert opinions from companies, other countries, international institutions and NGOs. Another limitation of the secondary data is that statistics from different sources can differ. This became a problem during the data collection and it was difficult to evaluate what data to utilise.

The initial thought for this thesis was to visit Myanmar myself and conduct primary research from the locals' point of view, however, time ran out and in order to finish the thesis in time (spring of 2019) this was impossible. Nonetheless, secondary data provided me with a wide understanding from an outsider's perspective of the situation in Myanmar.

PRIO and A4AI provided me with hard evidence that they have collected themselves, but the informant number 3 mostly discussed the observations collected when travelling to Myanmar and second-hand observations can be difficult to rely on. Informant 3 did however have knowledge on the regime change from its own research for the master's thesis.

Lastly, there are some limitations to the research design. This is partly related to the limited number of interviews, which is a limitation to the qualitative research method. The use of qualitative methods compared to quantitative implies that generalisations cannot be made, and the findings in this study cannot be used to provide a general overview of the situation in Myanmar.

5. FINDINGS AND DISCUSSION

This chapter will introduce the findings that are specifically relevant for the research questions and the thesis. In contrast to the background chapter, where relevant information about Myanmar's history, social and cultural background, political transition and history of digitalisation were introduced, this chapter will assess the findings of the current situation of internet access in Myanmar, and the challenges and opportunities that Myanmar is experiencing due to increased internet access.

The objectives and research questions will be directly investigated and discussed in this chapter. Firstly, the situation regarding access to Internet will be evaluated and discussed with the use of SDGs 9 and 17. In the second part, the challenges and opportunities will be presented. Lastly, the sociotechnical transitions will be used to discuss the findings regarding this approach.

5.1 The current situation regarding access to Internet in Myanmar

Access to Internet has increased enormously in Myanmar in recent years with the increasing infrastructure and availability of ICTs. This has contributed to significant growth in the demand for mobile phones, SIM cards, and broadband among the population. Even though there have been substantial developments in the Internet and ICT sectors, there are still potential for further growth. The digital infrastructure today covers most of the population, but there are some hindrances yet to overcome. This sub-chapter will investigate the findings regarding Internet penetration and mobile penetration in the country and will examine what this means for their digitalisation process and the digital divide. Secondly, the findings will be assessed in regard to SDG 9 and 17. Finally, the digital gaps in who has access will be investigated. Table 1 below gives an overview of the current situation in Myanmar, and the data will be further explained in the sections in this sub-chapter.

Year: Context:	**2010**	**2015**	**2016**	**2017**	**2019**
Poverty		32.1% lives below the poverty line			30% lives below poverty line
Mobile cellular subscriptions	594,000 subscriptions	41 million subscriptions		48 million subscriptions	
Fixed broadband subscriptions		32,921 subscriptions		111,567 subscriptions (0.1% of population)	
Internet users	0.25% of population		25% of population	30% of population Women 19%, men 29% Rural 16%, urban 41%	40% of population
Internet coverage		70% of population		90% of population	
Mobile ownership				62% of population Rural 40% Urban 84%	
Cost of mobile broadband		5,9% of GNI per capita		1,47% of GNI per capita	

Table 1. Overview of current situation in Myanmar from 2010-2019. Sources: World Bank, ITU, CSO et al, Telenor, A4AI.

5.1.1 Internet penetration

Fixed broadband and mobile broadband is, as previously explained, two different types of Internet access. In Myanmar, where Internet was until 2012-2013 limited and heavily censored, Internet has not been a privilege for a large amount of the population. As a result of the liberalisation of the telecommunications sector, mobile networks and telecom infrastructure have been built across the state. Since the democratisation began in 2011, connectivity of the population has been prioritised by the Myanmar government in an effort to modernise the country (Calderaro, 2016).

Assessing the data found for fixed and mobile broadband there is evidence confirming that Myanmar has developed digitally in recent years. Number of fixed and mobile broadband subscriptions can be used as measures to evaluate the situation of Internet access in Myanmar, as suggested by the SDGs.

Looking at the fixed broadband, according to Telenor (2018) this covers only 0.1% of the population and ITU (2017) introduces an even lower number of 0.06% of the population. According to World Bank data (n.d. a), the number of fixed broadband subscriptions are 0.209 per 100 people and World Bank cite their source as ITU. The exact number of fixed broadband subscriptions per 100 people is therefore uncertain. Nonetheless, the number is low, also compared to the country's regional neighbours . Fixed broadband subscriptions are also reported in total number. As of 2017, there were a total of 111,567 fixed broadband subscription and this number has increased from only 243 in 2005 and 32,921 in 2015 (World Bank, n.d. c). The significant increase illustrates how the country has modernised in the last five years but compared to neighbouring countries the number of fixed broadband subscription is still very low. Bangladesh, for comparison, have more than 7.3 million fixed broadband subscriptions (World Bank, n.d. c). The number of fixed broadband subscription in Myanmar compared to Bangladesh can be a result of the limited infrastructure for broadband before 2013, and that mobile broadband has been prioritised since the telecom sector was liberalised.

Proceeding to mobile broadband (the use of Internet through mobile networks), the number of users is higher than that of fixed broadband. Myanmar is considered to have one of the fastest mobile broadbands in Asia, which has been developed in only 3-4 years since the establishment of the liberalised telecom sector in 2014 (Telenor, 2018). The number of mobile cellular subscriptions is estimated at 48 million in 2017, an increased from 41 million in 2015 and 594,000 in 2010 (World Bank, n.d. f). Because of the revolution of the mobile phone, access to mobile broadband is easier than fixed broadband, and especially in countries (such as Myanmar) where rural population is in majority (ITU, 2012). Owning a mobile phone and subscription to a mobile operator are relevant factors here due to the decreasing costs. The UN target for mobile broadband cost is set to be lower than 5% of GNI per capita (A4AI, 2015) and this has decreased from 5.9 % in 2015 to 1.47% in 2017 (A4AI, 2019). ITU (2018) reports that the prices for mobile cellular baskets, meaning the price of mobile data packages (ITU, n.d.), is less than the target of US$ 3, and is as low as US$1.61 per month. Due to the low prices of mobile broadband for handsets (e.g. mobile phones), Myanmar ranks in the top 10 of the lowest prices in the world (ITU, 2018). The cost of mobile broadband for computers has also decreased drastically, and the prices in 2017 was one third of that in 2016 (ITU, 2018).

Due to the fast and short time of establishing a proper mobile broadband in Myanmar, people have chosen to use broadband via their mobile operator rather than fixed broadband. This can also be related to the restriction and limitation that were previously affecting the population for owning a personal computer modem (Freedom House, 2011), and the lower costs of a mobile phone versus a computer.

From the numbers comparing fixed and mobile broadband it is clear that Internet is more widely accessed via mobile operators rather than through fixed broadband, mostly because the government prioritised the telecom sector after 2011 ensuring that the mobile broadband is sufficient. However, the number of subscriptions to fixed and mobile broadband does not necessarily illustrate how many people using the Internet regularly.

Using numbers of actual Internet usage, we see that the increase in usage is massive since 2010. World Bank (n.d. d) suggest that around 30% of the population were active users of the Internet in 2017, which is an increase from 0.25% in 2010 and from 25% in 2016 (ITU, 2018). Active users of the Internet imply that Internet is used in the last three months of the time when the data was gathered (Wold Bank, n.d. d). Households with Internet access is also interesting to investigate. ITU (2017) suggest that 24% of households have access to Internet in their household. This can be either mobile cellular network or fixed broadband and includes tool that have Internet access, but the requirement is that all members of the household has the same access to the Internet source. This number therefore excludes those individuals owning their own mobile phone, where Internet is accessible.

In relation to the indicators in the SDG targets 9.C, 17.6 and 17.8, the current situation in Myanmar will be discussed here. Target 9.C is estimating the number of people that are covered by both Internet networks and technology in the world and use *the share of population covered by mobile network* as an indicator. As Telenor (2018) reported, mobile networks are within range of 90% of the population, which implies that 90% of the population have Internet and voice communications network available. Whether all 90% of the population utilise this availability is linked to other factors than only availability. In 2015, almost 70% of the population was covered by mobile networks, and at the time this was only 15 percentage points below the world average (CSO and UNDP, 2017). The number of inhabitants covered by mobile network does not include the actual number of mobile subscriptions, a number that can even better illustrate how technology is covered in Myanmar. Target 9.C includes universal access and affordability to Internet, with a focus on LDCs. In Myanmar, both these factors are progressing with the 90% network coverage and

decreasing prices for broadband and SIM cards. However, Myanmar is considered a *least developed country* (ITU, 2018), where a large share of the population lives below the poverty line. Asian Development Bank (2019) estimated that 32.1% of the inhabitants lived below the national poverty line in 2015. Affordability is therefore still a challenge for the poorest.

From SDG 17, two targets are relevant for discussion. 17.6 concerns access to science, innovation and technology, and cooperation between states. 17.6.2 use *the number of fixed broadband subscriptions* to evaluate access to technology and digital innovation tools. The number of fixed broadband subscriptions was discussed in the first section and is set at 111,567 in 2017, but only accounts for 0.1% of the population. I would argue that fixed broadband subscription might not sufficiently illustrate the level of technology and innovation in a country, especially in this digital revolution. Because fixed broadband is relatively uncommon in Myanmar this target is far from reached, in will possible not be achieved either as mobile broadband is more widely used today. Number of mobile broadband subscription could possibly be more relevant because infrastructural wise, this is easier to establish in newly digitalised countries, such as Myanmar.

For SDG target 17.8 the focus is on strengthening capacity of science, technology and innovation in LDCs. This target focuses on the use of ICTs and has the indicator of *Internet usage* as a measure. In February 2019, the number of Internet users was reported at 40%, where 99% are accessing Internet from a mobile phone (Ko Ko, 2019). Internet access is different from those who *use* the Internet, and this indicator demonstrates how that is the case. The number of Internet users is relatively lower than those who have access through mobile networks, and those who have mobile broadband subscriptions. The number of people with mobile broadband subscriptions is estimated to be around 47% in 2017 (ITU, 2017). Universal access to Internet is not met in Myanmar, but it is progressing, and the obstacles to access must be addressed in order to ensure that this goal is achieved.

As the target stresses, Internet usage contributes to strengthening the capacity of technology, in addition to innovation in the long run. However, as Gjesvik and Schia (2018) acknowledge, there is a limited cyber-capacity in Myanmar due to lack of regulations and laws for use of Internet. This contributes to restrict the ability of strengthening the technology capacity in the country, even though the number of Internet users are continuously increasing.

In addition to the gaps in internet access, there are also several obstacles to access. Even with improved access and number of Internet users, in addition to increasing speed and

quality of telecom services, there are several obstacles presented by Freedom House. Compared to the average in the Asia Pacific, the speed on Internet is relatively slow, and this is especially evident in towns were the quality of telecom network and Internet is poor (Freedom House, 2018). Rural villages are worse off, and even though the telecom operators continuously attempt to improve infrastructure, the government restrict their ability to establish new cell towers (Freedom House, 2018). Other factors such as weather, corruption and poor electricity are also limiting the development of new telecom infrastructure (Freedom House, 2018).

5.1.2 Assessing how Internet is accessed

Mobile phone and computers are the two main mediums through which Internet is accessed. When assessing the current situation of Internet access in Myanmar, it is relevant to evaluate mobile phone penetration, and computer ownership is included to illustrate the huge divide between mobile ownership and computer ownership.

With the strict laws limiting the population from owning a computer before 2011 and the large increase in telecom infrastructure, it is obvious from statistics that mobile phones are more common than computers (for personal use). The costs of computers are often higher than that of mobile phones, and this is of course also an important factor. ITU (2017) estimates that the number of households owning a computer is at 13.64%, a number that is relatively low but not unexpected taking the country's previous repressive government into account.

I argue that using mobile phone ownership as an indicator can be relevant in the case of Internet access and technology capacity. Looking at the number of mobile phone ownership, World Bank (2017 a) estimate that 62% of total population own a mobile phone. Comparing this number to the 50% unique mobile subscription (Telenor, 2018), it can be argued that a large portion of those owning a mobile phone also have mobile subscriptions. The huge growth from 2013 to 2018 illustrates the importance of the liberalisation of the telecom sector and the potential that Myanmar has. This is interesting to examine because a mobile phone, and especially with access to cellular network, can be a very useful tool for business, accessing information and as a communication tool, etc.

Myanmar had one of the lowest mobile penetration rates in the world before 2013, and has grown massively since then (Telenor, 2018). According to World Bank (2018), mobile phone users increased from 13% in 2013 to 108% in 2017, where before 2013, the number was at less than 7% (Telenor, 2018). The number of smartphones is very high at

approximately 80% of all phone types in 2018 (World Bank, 2018). In Yangon, 91% owns a smartphone and 2% owns a 'keypad only' phone, while the numbers of smartphones are little lower in rural areas (World Bank, 2018). The 80% smartphone penetration is higher than any other country in the region (Telenor, 2018).

The number of mobile subscribers is far from as high as the number of people owning a mobile phone, and this can explain the difference in ownership and users of mobile phones. In 2015, A4AI (2015) said that the market for mobile subscriptions was the fastest growing in the world. This can be due to Myanmar transitions from isolation and building the telecom sector enormously only after 2013 and not in earlier years, but that the market experienced a significantly growth illustrates the demand for phones and willingness of the population to become more digitalised. CSO et al (2018) estimate that the mobile phone market was the fastest growing among consumer goods in 2017. This implies that there is a huge potential for further growth in the mobile broadband subscription market. The number of mobile phone users in total is estimated to be 62%, where the survey was undertaken in 7 days in order to calculate the regular users (CSO et al, 2018). Comparing the use of mobile phones to the unique mobile broadband subscription (47.83%) from the section above, indicate that there are more users (owners) than there are actual mobile broadband subscriptions. This illustrates that the argument of CSO et al (2018) is correct, and there is a potential for the number of mobile subscriptions to rise.

> The use of mobile phones is observed by an informant, claiming that from 2012 and 2016, Myanmar experienced a massive transformation. During the first visit in 2012, the informant observed very little use of mobile phones, and the Internet access was very limited, almost impossible. The country was "essentially blacked out". The second visit in 2016, however, mobile phones were everywhere, and smartphones were mostly used. Internet was present in 2016, compared to 2012, but was very slow, "but at least they had access to Internet". Even in small villages, there was now phone shops selling smartphones and SIM cards.
>
> *(Observations by Informant)*

Looking at the ICT Development Index (ITU, 2017) in relation to the data discussed above, where several of the sub-indexes had been used, Myanmar ranks as number 135 as of 2017 (the most recent number), where the highest number is worse off. In 2016, Myanmar ranked 140, which was a significant progress in only one year. This implies that there is potential, but still a long journey ahead. Compared to Bangladesh, which was ranked 147 in 2017, Myanmar has a better IDI ranking (ITU, 2017). The value estimated from the IDI, concludes that Myanmar is at 3.0 in 2017, where the highest value is 10 (the highest level of ICT development) (ITU, 2017).

5.1.3 Gaps in access to Internet

There is a divide in phone ownership and Internet usage between urban and rural areas in Myanmar. However, CSO et al (2018) suggest that this gap is mostly related to socio-economic factors and purchasing power rather than infrastructural limitations. The mobile ownership gap was larger immediately after the liberalisation of the telecom market but has decreased to 81.5 % in urban areas and 76.7% in rural areas (CSO et al, 2018). World Bank (2017 a) data suggests that the gap between household mobile phone ownership is larger in rural areas where 40% owns a mobile phone, while there are 84% in urban areas. The digital gap is even larger between poor and non-poor, where 29% of poor households own a mobile phone and 61% of non-poor (World Bank, 2017 a). In hill and mountain areas, people are poorer than any other areas in the country and World Bank (2017 a) estimates that four in ten are poor. Conflicts have also been an obstacle in these areas, resulting in infrastructural challenges for the telecom operators (World Bank, 2018). This implies that phone ownership is most likely even lower in these areas, due to the low purchasing power. Looking at Internet use, there is also a clear gap between rural and urban areas. For the population above the age of 15, Internet use in rural areas is estimated to be 16% while it is at 41% in urban areas (World Bank, 2017 a). The gap between urban and rural Internet use is significantly larger than that of mobile phone usage.

Another factor that has emerged in the digital divide discussion is educational attainment. To illustrate, only 1% of the people with no education use the Internet and only 22% use a mobile phone. For those who have reach tertiary attainment, Internet use is estimated to be 75% and mobile use 96%. This proves a huge divide, and educational attainment is obviously an important factor for Internet and mobile use.

Looking at the digital gap from a gender perspective, there is a divide in Internet use and mobile phone use between men and women. For Internet usage for the total population, 19% of women use the Internet and 29% of men (CSO et al, 2018). The numbers are also differing between urban and rural areas, where urban use of Internet is 36% for women and 48% for men, and in rural areas only 12% of women use the Internet and 20% of men (CSO et al, 2018). There is a gap between genders for mobile phone use as well. Here, female use is at 57% and 68% of men for the total population above 15 years of age (CSO et al, 2018). This illustrates that the digital divide is clearly a challenge in Myanmar. The progress in Internet access and mobile phone ownership is increasing, but from a gender perspective the country is lagging compared to other countries (World Bank, 2018). As an informant stressed, Myanmar must prioritise to include women in the future of Internet access.

Digital gaps will always occur, especially in developing countries, because of the huge differences among the population in terms of affordability, accessibility, availability and cultural aspects. This is especially evident in the contexts of rural and urban gaps, and between education attainments. Form the gender perspective, on the other hand, there are often other factors involved. This aspect will be discussed further in *challenges*.

5.3 Assessing the challenges and opportunities of increased access to Internet

In Myanmar, there are both opportunities and challenges connected to the increasing digitalisation. This chapter will discuss the findings regarding the two sides and use the technological transitions approach to examine how the society is adapting to the changes that the digital revolution and Internet access brings.

The table (table 2) below illustrates how the opportunities and challenges are categorised in three contexts; social and society; political; and economic.

Implications of Internet access: *Contexts:*	**Opportunities**	**Challenges**
Social, society	• Use of social media for empowerment • Decreasing poverty	Digital divide: • Digital skills • Gender • Ethnicity • Rural vs Urban Internet 'not free' Hate speech & online violence
Political	• Democratic values • Digital voting; free and fair • Access to information	• Censorship & Surveillance • Limitations on freedom of expression • Lack of cyber security regulations
Economic	Economic growth • GDP • Trade Decreasing poverty Financial inclusion Mobile-banking	Lack of regulations and law on cyber security • Exposed to cybercrimes/attacks

Table 2. Challenges and opportunities of Internet access. Sources are referred to in the sections below.

5.3.1 Opportunities of Internet access in Myanmar

With the digital revolution that the world is experiencing today, there are many opportunities access to Internet brings. Internet can contribute to promote development through access to information faster and from everywhere, through technological development, by increasing potential innovation, and by digitalising business (World Bank, 2016). The Internet can promote development in three distinct direction; innovation, inclusion and efficiency. In addition, there is a huge potential for economic growth and this aspect is particularly important for Myanmar. A4AI (2018) suggests that digital solutions are essential elements for development and economic growth today.

5.3.1.1 Economic potential of Internet

From an economic perspective, the digital revolution brings huge potential. In a country as Myanmar, where the digital revolution has started later than in the developed parts of the world, there are many opportunities that comes with increasing access to Internet.

Economic growth and gross domestic product (GDP) has increased massively since 2011, and Telenor (2018) estimates that their contribution in the telecom sector alone is a 5% rise in GDP. Between 2014 and 2017, Telenor has also contributed with 110,000 new jobs and 540,000 people has benefitted from education and health programs the company has introduced. World Bank (2019) argue that the economic growth of 6.8% from 2017 to 2018 is due to the well performing telecom sector, in addition to increased domestic trade. Myanmar has a huge potential in digital trade, and telecommunications accounted for 85% of ICT services exports in 2016 (UNCTAD, 2017). The number has most likely increased since then. GDP has increased from US$ 59.6 billion in 2015 to US$ 67 billion in 2017 (World Bank, 2017 b), which can be argued to correlate with the digital transformation that has occurred. E-commerce has increased with the number of Internet users and smartphone owners, and account for 0.07% of the country's GDP (Ko Ko, 2019).

The digital economy has not yet been introduced properly. As of 2018, only customs clearances and tax fillings have been partly digitalised, which accounts for only a small part of the digital economy and government (Telenor, 2018). Because of the limited digital economy today, businesses are also hesitant to adopt digital solutions, implying that the change towards a digitised economy is relying on the government (Telenor, 2018). In addition to the reluctance, there is also a lack of knowledge and ability of the Internet and cyber security, especially for small businesses, and the government has to ensure that skills and regulations are sufficiently introduced for the digital economy to succeed (Gjesvik and Schia, 2018).

Nonetheless, the potential for a digital economy is evident. In finance and banking, digital development has occurred. The rapid telecommunications development has been beneficial for financial inclusion in Myanmar, and mobile money transfer services are partly established for those with smart phones and Internet access (OBG, 2019). For the Banking sector, the state-owned banks still influence most of the sector, and though there are an increasing number of international banks operating in the country (OBG, 2019), progress must be initiated by the government. This is relevant for the digitalisation of the banking sector.

A cooperation between Telenor and Yoma Bank, a private bank in Myanmar, has created Wave Money, a mobile money transfer service where the customers Wave account is linked to the Telenor mobile number (Wilson, 2018). Via the customer's mobile phone, it is possible to transfer money to anyone with a Wave account (Wilson, 2018). This initiative is

one of several similar projects that introduced easy and efficient solutions for financial inclusion and a step towards a digital economy.

Earlier this year, the government announced the *Myanmar Digital Economy Roadmap* that demonstrates how the country needs to develop in order to establish a "digital economy ecosystem" (Ko Ko, 2019). The Roadmap is said to digitise not only businesses, but also agriculture and manufacturing to ensure that living standards will increase in the coming years (Ko Ko, 2019). The Vice President acknowledged that the first step in the process of digitising the economy, is to establish and change rules, policies and regulations regarding the economic infrastructure (MOI, 2017).

Poverty is estimated at 30% in 2019, where poverty is 9% in urban areas and 20% rural areas, which is a decrease from the 2015 number (Nanda, 2019). This decrease can be linked to economic growth and improved living standards. While a direct link between access to Internet and decrease in poverty cannot be confirmed, there is most likely a correlation because of the huge developmental improvements digitalisation and Internet access can contribute to. The higher percentage of poverty in rural areas indicate that development, in all sectors, must be focused in these areas.

Improvements in the digital economy allows for many economic opportunities and does also contribute to economic development and empowerment (Telenor, 2018). Poverty can decrease, more people can be included in banking and finance through their mobile phone, and there is a potential for economic growth and digital trade. However, there are some challenges that must be addressed for the digital economy of Myanmar to flourish.

5.3.1.2 Social media

With the increasing use and ownership of smartphones in Myanmar, the use of social media has risen significantly. For a large share of the population, as claimed by an Informant, Facebook is *the* Internet, and another informant pointed out that most information is retrieved from Facebook. Facebook penetration is at 27% of total population (Telenor, 2018), which in itself is not a particularly high number. Comparing that to the 30% active users of Internet in general (World Bank, n.d. d), however, that number is quite significant. For the application Viber, a messaging app, the penetration is 35% of total population (Telenor, 2018). This

implies that there is a demand for digital communications and platforms for information and expression.

Facebook is used as a platform for women's empowerment, and there are many examples of how women are using Facebook as a platform for business and for expressing themselves. Facebook has become a tool for people to share their thoughts and opinions in a completely new way, and to find likeminded persons to discuss with. Activist and NGOs use Facebook to communicate and to share their vision, and most people use it as a source for information and news (Einzenberger, 2016). The platform has contributed to empowerment of marginalised groups, and especially women. Facebook allows many women to become economic and politically empowered (Hansen, 2018).
Nonetheless, with the opportunities of freedom of expression on the Internet, there are also several challenges that follows.

5.3.1.3 Promoting Development and Democratic values

Internet access can promote development and democracy, but in Myanmar both these aspects have been limited in previous years as a result of the authoritarian rule before 2011. While the country has adopted several democratic values since the end of the military rule, there are yet some steps ahead for Myanmar to be considered a democracy. The country has adapted a civilian parliament and is progressing in the right direction, but due to some seats in parliament being reserved for the military this limits the democratisation. Myanmar is considered an illiberal democracy today (Ko Ko, 2018), but as the digitalisation and Internet access increases further, democratic values can be established. With willingness from citizens and demands of democratic values, it can be established with Internet access. Access to Internet can contribute to free and fair elections, to more informed voters (if government does not manipulate information), to give citizens' a voice and to collective action (World Bank, 2016). Digital voting registry was introduced for the election in 2015 and had not been used for previous elections (Sweeney, 2015). This ensured reduced errors and frauds and the election was considered free and fair (BTI, 2018). With the increasing access to Internet, information has become available for voters. The 2015 election introduced a voter education campaign, which contributed to an increase in citizens' engagement (Sweeney, 2015).

The democratic values that are in progress in Myanmar, does also improve development. This is, in combination with economic growth, decreasing poverty rates, and availability of

Internet, constitutes major milestones for the country. The correlation between Internet access and development is based on fostering inclusion, increasing innovation and promoting efficiency in a society. For Myanmar, the three aspects are improving, but there are nonetheless challenges that are important to address.

5.3.2 Challenges of increased access to Internet

As an informant argued, the Internet can be illustrated as a "double-edged sword" in Myanmar, because of the negative *and* positive effects on the society. The divide between the two is diffuse and there are often two sides to every situation. The opportunities are there, but the problems that Myanmar is facing are mostly related to challenges that Internet access can contribute to. From an economic perspective, there are huge potential for growth, which will improve living standards and inclusion. But the lack of regulations regarding digital economy, in addition to limited skills and knowledge of Internet, restricts the improvements that are undertaken as of now. Several challenges will be further assessed here.

5.3.2.1 Digital divide

The digital divide is one of the largest hinders to development and universal internet access in Myanmar. The digital divide can, as demonstrated in chapter 3, be categories in within different contexts. There is a divide in digital skills and a digital gap for rural – urban and gender in Myanmar.

Digital skills are a huge challenge to overcome in Myanmar. As a result of the rapid transformation from zero digitalisation to one of the fastest growing digital nations, skills have not been prioritised or adopted through a longer process of digitalisation. Comparing Myanmar to developed countries were Internet was introduced to a larger degree in the 1990s, the few years to gain knowledge of the use and opportunities of Internet cannot compete with the almost 30 years of experience. During the 30 years of access to Internet in the developed world, ICT has been taught in schools and, from my own experience, training has been sufficiently available. In Myanmar, on the other hand, after Internet was properly introduced, a larger share of the population lack the necessary training for digital skills. Among the Internet users, 78% have poor digital literacy (Telenor, 2018). This implies that approximately 20% of the users have proper understanding and knowledge on how to use the Internet and are aware of the safety assurances that must be considered. The low digital skill

level also suggest that Internet use is mostly for social media, entertainment and communications, rather than used as a tool for social and economic development (Telenor, 2018). The low skill level is relevant for the digital workforce, as those sectors that are becoming digitalised. Local workforce is therefore considered less competitive resulting in imports of digitally skilled labour from abroad (Telenor, 2018). The Myanmar government has, from the 2015-16 academic years, introduced ICT in education, and digital literacy training is becoming more common within government and other sectors (Telenor, 2018). Hopefully, this will increase the digital literacy rate, but will, nonetheless, take time.

The digital gaps occur when one group, or groups, have restricted access to Internet compared to other groups in the society. The most evident gap in Myanmar, is between rural and urban populations. As demonstrated with statistics above, Internet access and mobile phone penetration are far less in rural areas compared to urban. For illustration, fixed broadband for Internet access was not used by a single household in rural areas in 2017 (CSO et al, 2018). Even though the fixed broadband penetration is very low in general, this implies that the use is specifically in urban areas. In general, Internet use is low in rural areas, and while the number of mobile phone users is larger, it is still significantly lower than in urban areas.

Examining the gender gap in Internet access further, women are 29% less likely to own a mobile phone (Zainudeen and Galpaya, 2015). The largest gap is found for households with the lowest monthly expenditure (Zainudeen and Galpaya, 2015), and considering the high poverty rate, this number can account for a substantial share of the population. The limitation on access to Internet is mainly based on socio-economic factors, particularly for women living in rural areas where being a 'housewife' is fairly common (Zainudeen and Galpaya, 2015). Men are often regarded as the 'breadwinner' of the family, which implies that they are also prioritised for access to Internet and mobile phones. For women, education and access to services are important factors, factors relevant for rural and urban differences as well (Zainudeen and Galpaya, 2015). In Myanmar, there are clearly several factors that affects the gender gap for Internet access, some are addressed here for demonstration. Gender norms, especially in a country with several ethnicities, is a challenge for universal Internet access. This was stressed by two of the informants.

Even though the digital divide can be related to socio-economy and geographic factors, there are also scepticism of Internet especially among women (Zainudeen and

Galpaya, 2015), and in rural areas where they are less exposed to the digitalisation. Even so, the government, through education and digital training, must ensure that citizens, of both genders and from across the country, are aware of the potential Internet can bring. Socio-economic development is dependent on digitalisation, where the population's adaption to Internet use in a secure manner is essential (Scott et al, 2017). This contributes to reducing the gender gap, the rural – urban gap, and the digital divide in skills.

5.3.2.2 Internet censorship and surveillance

During the military repressive rule in Myanmar, censorship was very common. Even though Internet censorship has decreased since 2011, there are several cases demonstrating that the government is using illiberal tactics to restrain information and silence those who speak against them. Freedom House (2018) reports through their *Freedom on the Net* report that Myanmar is 'not free' and there is found several violations against rights to information and expression, and incarcerations due to 'controversial' media coverage (according to the government). Interned freedom has declined in 2018 mostly because of the conflicts between the State and the Rohingya Muslims and the violence that has occurred as a result of this (Freedom House, 2018). This has caused less diversity in information online, because propaganda targeting the Rohingya Muslims is spreading, and the government controls and shapes the public information that is published (Freedom House, 2018). The journalists that are covering the violence and "ethnic cleansing" have been prosecuted, and are risking intimidation and violence (Freedom House, 2018).

Regulations and laws on telecommunications, and online surveillance mechanisms established in 2018, continue to imprison users as well as journalists covering the Rohingya situation (Freedom House, 2018). The decline in Internet freedom is unexpected because the governing party, NLD, was anticipated to improve the situation in Myanmar regarding censorship and surveillance. In illiberal democracies, the information of the Internet becomes unreliable due to the ability of government to limit and shape information that is available (Pirannejad, 2017). In the case of Myanmar, this has become a central challenge. Without proper democratic values the government can continue to use the Internet as a tool *against* the citizens. The telecom regulator, Posts and Telecommunications Department, is not operating autonomously (ITU, 2018) and in 2015 this was mandated by law, but has not yet occurred (Telenor, 2018). An informant pointed out that the human rights violations in regard

to Internet is limiting the legitimacy of Internet access and use in Myanmar, and social media has become a source of disinformation and misinformation.

5.3.2.3 Social media

Social media, particularly Facebook, has become a platform for hate speech, disinformation and misinformation. In the ethnic conflict with the Rohingya Muslims, Facebook was used to publish propaganda and hate speech against the Muslims, resulting in the UN accusing Facebook as a player in the conflict (Shealy, 2018). Information on Facebook was in this sense controlled by the government, in order to vilify the Rohingya Muslims (Shealy, 2018). The UN explained that the Myanmar government "consistently fail to respect international law, including by deliberately targeting civilians" (UN Human Rights Council, 2018). The ethnic conflict that has been heightened via Facebook, has caused massive displacement of Muslims and many were forced to flee the country during 2018 (Human Rights Watch, 2018). Important to take into consideration is the decades long tension between ethnic minorities and the government. The notion of Burmese and non-Burmese, and Buddhists and Muslims, has caused challenges before the increased Internet access. With social media these conflicts have escalated. The use of Facebook in this regard could not have been predicted, but the propaganda through government, and especially the military, has encouraged civilians to engage in the conflict. The problems that Internet access and social media has caused are a serious challenge for Myanmar, and as an informant said, "the Internet exists, Facebook exists, but it's crazy and frightening."

> Social media space and its features is uniquely beneficial for hate speech and harassment, because of anonymity, and could therefore allow this to happened [*hate speech*]. Speed of digitalisation is an issue because they lack the critical perspective of using social media. People don't understand that there is more to Internet than Facebook, not getting other sources of information. Internet is ambiguous, depends on how people use it. Depending on the harassment/ violence online explain the degree of seriousness of this problem.
>
> Activists [*who used Facebook prior to the conflict*] regard social media as not a safe place.
>
> *(Thoughts of informant)*

5.3.2.4 Cyber security

The last challenge to be assessed is cyber security, and Myanmar is lacking suitable regulations and laws to ensure this. The 2017 *Law Protecting the Privacy and Security of Citizens* did not properly address intellectual property, lawful interception and data protection in general (MCRB, 2018). Lawful interception implies that government conduct electronic surveillance of civilians (CISCO, n.d.). Telenor and Myanmar Centre for Responsible Business suggests that there is established a Cyber Security Framework that will protect human rights and promote development, where data protection, data privacy and digital literacy is emphasised (MCRB, 2018). A cyber security framework must ensure that law and regulation are restricting cybercriminals rather than regular Internet users, and this must be sufficiently distinguished. A problem that is evident in Myanmar is the cybercrime laws have criminalised most activity online and are in that way not limited to criminalise those who are actual *criminals,* but also people who are only expressing themselves online or accessing 'sensitive' websites (Calderaro, 2014).

The challenge that occur when Internet is widely used, but there is lack of cyber security and digital skills, is that the country and individuals are prone to cybercrimes and attacks. In addition, Myanmar lacks cyber-capabilities, and the country becomes an attractive place for cybercrimes and attacks (Gjesvik and Schia, 2018). However, cybercriminals target individuals and businesses as well, and without digitals skills or understating of security online, Myanmar citizens are easy targets. The main finding is that government, businesses and Internet users alike are not aware of the cyber security risks, and safety measures are therefore not considered (MCRB et al, 2015).

Internet can become a problem in countries that lack proper infrastructure, experience governance issues and were poverty is a challenge, especially because such conditions create a breeding ground for organised cybercrimes (Schia, 2016). This is relevant for Myanmar because of instability in governance, the ethnic conflicts that have occurred in recent years (Kipgen, 2016), but also the high percentage of poverty in the country (World Bank, 2017 a). The transformation, both digitally and politically, that Myanmar is still undergoing is also an obstacle to the implementation of cyber security (Gjesvik and Schia, 2018). Because of the history of Myanmar and the power that the military still holds, increased access to Internet has result in surveillance and control by the government. Lack of capacity to ensure cyber security can be related to technological and policy-related factors (Schia, 2016), and lack of relevant digital infrastructure (Calderaro, 2016).

5.4 Discussion: Socio-technical transitions and Internet in Myanmar

> "Interestingly, it has been shown that rolling out mobile phone networks is the most powerful development 'intervention' since it facilitates better communication, increases access to information, allows users to coordinate better and markets to function more smoothly, and ultimately improves people's livelihoods."
>
> (Zainudeen and Galpaya, 2015: 10)

The quote above by Zainudeen and Galpaya (2015) demonstrates the importance of mobile phone networks for development and describes how the Internet transition in Myanmar is central in that regard.

Technical transitions are used to explain and assess how technological transformations change societal functions. For Internet access in Myanmar, it is evident that a huge transformation has occurred due to the changes that has emerged on economic, political and societal levels. The political transition that commenced in 2010-11 had a massive effect on the digitalisation process that began in the years after, contributing to a transition from a barely digitalised country into a digital hub. Technological transitions involve technologic change, but also changes in regulations, infrastructure and skills. When assessing Internet in the context of sociotechnical transitions, it is evident that it cannot be regarded as an invention. Because Internet was invented long before, the transition of Internet in Myanmar can be regarded as demand for *social change*, with pressure from the international arena as well as from the citizens (consumers). With abolishment of the military regime, the political and social landscape began a slow transition. However, Internet becomes an independent regime, where it is the driving force for transition. I will therefore argue that Internet becomes an 'invention' on the regime level rather than at the niche level, because of the exiting Internet landscape in countries outside of Myanmar. Even though Internet existed before the political transition the access was limited and restricted. The Internet before the political transition can therefore be regarded as the old Internet regime, where the political transition laid grounds for the new Internet regime to emerge.

When the telecom market was liberalised, it resulted in massive changes in infrastructure, regulations and skills that were necessary for transition within the Internet landscape in Myanmar. Important to stress, is that this is a transition in process, and the

landscape has not yet been fully operationalised. The challenges must be addressed and improved before the landscape can be considered comprehensive.

Technology has been described as tools. The Internet transformation in Myanmar are related to the necessary materials, components and infrastructure that combines into a working system, the Internet, becoming tools for development. Sociotechnical transition entails that there are changes in markets, policies, user practices and cultural meaning. The market changes for Internet access in Myanmar are related to the telecommunications market. These changes have contributed to economic changes, as well as societal. There has been economic growth and opportunities for a digital financial sector, mobile banking and digital trade. The mobile phone market has increased enormously since 2014, contributing to access to information, communications and business opportunities. The policy changes have not yet been appropriately addressed, and this is related to problems in governance and the political transition that is occurring. Considering that Myanmar is regarded as an illiberal democracy, this causes challenges in the sociotechnical transition. However, a few policy changes have occurred, and several has been suggested or are in progress, especially regarding cyber security.

When assessing the changes in the sociotechnical transition, it is evident that most changes has occurred within the realm of user practices. The transition from barely any access to Internet, to becoming an important element in the Myanmar society, demonstrates the importance of the transition. The most change is found in the number of mobile phones and the expanding coverage of mobile networks. As most users access Internet through a mobile phone, this is an essential factor for the Internet regime and landscape. This is also central for the cultural meaning as the Internet has become a vital tool for communications, empowerment, and in the daily life of the Myanmar population. In addition, I would argue that the digital divide and the gaps between those who have access to Internet and those who do not, can be address through the increased cultural meaning of the Internet.

Infrastructure has changed drastically because telecom operators are dependent on cell towers for their network. This has resulted in building the relevant infrastructure across the country, becoming close to covering the whole population. Infrastructure is a vital factor for Internet existence, becoming the first step in the transition. Because infrastructure for Internet is relatively coherent, other elements becomes the hinders for stability and operationalisation.

Looking closer at the regime level, this implies an embedded set of rules of sociotechnical development. Configurations are those diverse elements that realise the

functions of Internet. For the Internet regime in Myanmar, this counts for the telecom networks operating the mobile broadband (infrastructure) and mobile phones as tools for access and the elements that are essential for the use and function of the tools. There are policies in place that ensure the rights of citizens in using the Internet and cyber security measures to regulate and ensure safety of that use. In addition, the required skills necessary to understand how Internet functions and the opportunities that derives from it. The combination of these configurations is required for operationalising the Internet regime, and for stabilising the landscape.

For the Internet landscape to become operationalised, it requires that external trends that are relevant for the regime are changing simultaneously with the regime's set of rules. This implies that deep structural changes are acquired. The landscape changes are slow processes of altering ideologies and political culture that are relevant for the Internet regime. Internet has become a tool for expression, for political engagement and for building democratic values. However, because of the illiberal democratic characteristics of Myanmar the landscape has not yet been stabilised. The changes in Myanmar are dependent on human rights of citizens being adhered to, in addition to political stability. The challenges that Internet has brought, must be addressed to accomplish the sociotechnical transition.

The challenges in digital divide regarding rural demography, poverty and gender, are in addition to the limited regulative framework, the most evident hinders to the Internet regime. As the SDGs stresses, universal access must be fulfilled for development to reach the whole population. The Internet landscape cannot stabilise without universal access.

Social media is also relevant in this assessment. The Internet regime has acquired a cultural meaning that includes using Facebook as a stage for hate speech. The ethnic tensions among the population in Myanmar was intensified with access to Internet. This is an unfortunate outcome of Internet access but illustrates how social aspects within a country are affected by technological change. As argued by Van den Ende and Kemp (1999) the technological changes within sociotechnical transitions are changing simultaneously with social, economic and political developments, but these transitions are not necessarily in harmony.

The technical transitions approach stresses that linkages between technical and social elements are essential for stability in the regime and landscape, where social, economic and institutional change occurs. There are transformations in how the society functions. Beyond

the Internet landscape, there occurs changes in external elements. This transition has been slow in Myanmar but there are evident changes in labour, where jobs become digitalised, governments adapting to digital solution, and the financial sectors becoming dependent on digital services. The scepticism that some still holds to the digitalisation and use of Internet must be overcome. There is a potential for the Internet landscape to stabilise social, economic and political aspects, but with scepticism to the transition the stability will not be achieved.

Applying the sociotechnical transitions approach to the increasing access to Internet in Myanmar might not be regarded as conventional. The characteristics of this approach are often used to explain transitions on a larger scale, such as the computer regime. I argue, nonetheless, that this approach can sufficiently explain the transformation that Myanmar has experienced because Internet promotes changes in social, economic and political (institutional) aspects. The challenges to Internet access demonstrate the problems with simultaneous transformations within the three aspects but does also assist to address and understand further progress.

6. CONCLUSION

The purpose of this study was to assess how increased Internet access has contributed to challenges and opportunities in social, economic and political terms, and to assess the current situation of Internet access in Myanmar. Throughout the thesis, Myanmar's situation regarding increasing Internet access has been evaluated from different angles. The study aims to give insights into how societal, political and economic changes has occurred simultaneously with a transition towards digitalisation in Myanmar. Through three in-depth interviews and a wide range of secondary sources, this study has assessed Internet in a case study of Myanmar. The findings are divided into two objectives, one assessing the findings regarding the current situation of Internet access, and the other examining the findings related to challenges and opportunities.

The findings regarding the current situation in Myanmar demonstrates that there have been major improvements in the telecommunications market, which has improved the mobile networks. Mobile phones is the main tool for accessing the Internet, and the market for mobile phones exploded after the liberalisation of the telecom market in 2013. Internet access has improved mostly due to the developments in telecom networks, as fixed broadband is barley utilised in the country. An informant verified this from own observations, explaining that the usage of mobile phones had increased drastically from 2012 to 2016. By using SDGs 9.C, 17.6 and 17.8, analysis reveal that Internet access and usage has improved, but there are still challenges limiting parts of the population from access.

The findings regarding opportunities and challenges illustrate that there are diverging results in relation to the improvements and disadvantages of Internet access in Myanmar. The opportunities show that there is huge economic potential due to digitalisation options for the financial sector, such as mobile banking. The telecommunications sector has contributed to GDP growth, international trade and many new jobs within the digital sectors. Social media has contributed to women becoming economic and socially empowered, and the use of social media in general is continuously growing. Internet is also promoting development and democratic values. The election voting system became electronic in 2015, limiting the possibility of fraud. Information has become more accessible, which is a huge shift from when the military regime ruled in Myanmar.

Looking at the findings regarding challenges in Myanmar, there are obvious disadvantages of increased Internet access. The digital divide is a huge hindrance to digital improvements in the country, where rural-urban, gender, poverty and skills demonstrates how

a share of the population is excluded in the Internet transition. Several informants stressed the importance of addressing the gender divides in accessing Internet. Internet censorship and surveillance is a result of the illiberal characteristics of the democracy, and the government and military continuous to limit and restrict access to information. Journalists are imprisoned for covering the situation of the Rohingya Muslims, and regulations for telecommunications are criminalising Internet users. Social media has become a tool for hate speech against the Rohingya Muslims, showing the dark side of social media. Lastly, there are challenges regarding cyber security as laws and regulations are limited, and the country becomes an attractive place for cybercriminals.

The findings are discussed using the sociotechnical transition approach. The Internet regime that has evolved in Myanmar illustrates how technical advancement is transitioning in tandem with societal, economic and political changes, but not necessarily in harmony. This can relate to the wide spectre of challenges that Myanmar is facing and the sociotechnical landscape has not been operationalised as of now. The historical background of Myanmar is important when assessing the Internet transition due to ethnic conflicts and the digital divides, among other factors. In order for the Internet landscape to be stabilised, the regime, including skills, regulations, laws, infrastructure, user practices, cultural meaning, etc., has to change with the Internet transition. With the challenges that Internet has contributed to, the landscape cannot stabilise.

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